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Field Guide to the Aquatic Plants of Lake George, New York

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INTRODUCTION

This bulletin is a guide to the aquatic flowering plants and ferns growing in Lake George, New York, and its adjacent marshes. It includes a checklist, keys and illustrations, to assist in the identification of the aquatic vascular plants most likely to be encountered. If no location is given, it is assumed the species is common and may be found in suitable habitats throughout. Specific habitats may not be inferred from most cited locations; for example, "Dunham Bay" includes open water and adjacent marshes.

Our data are from observations and herbarium records. Many of the herbarium collections do not indicate whether the plants were taken from the lake or from some nearby aquatic or non-aquatic habitat; if such species are known to grow in water, they are included. A few species are included for which we have no records from the lake but which have been collected in the Lake George drainage area. Trees and woody shrubs are not included; we do not consider them to be truly aquatic.

The keys are based on vegetative characters as much as possible. As such characters are often variable; many of the genera appear in more than one place in the key. If the characters in the generic key trace to but one species in a genus having more than one, the species is named.

For descriptions, notes on habitats, additional keys, and additional illustrations, see one or more of the following references:

Fassett, N. C. 1957. A manual of aquatic plants. University of Wisconsin Press.

Fernald, M. L. 1950. Gray's manual of botany. American Book Company.

Gleason, H. A. 1952. The new Britton and Brown illustrated flora of the northeastern United States and adjacent Canada. New York Botanical Garden.

House, H. D. 1924. Annotated list of the ferns and flowering plants of New York State. New York State Museum Bulletin No. 254.

Muenschler, W. C. 1944. Aquatic plants of the United States. Comstock Publishing Company.

Where the names used in one or more of these books differ from the ones used here, those synonyms are given in parentheses, unless the derivation is obvious, such as: *Isoetes echinospora* subsp. *braunii* vs. *I. braunii*.

Detailed underwater surveys were made for some common deep water species using scuba gear. The diver (Richard B. Sheldon) recorded the data underwater as to species encountered at various depths from one to several meters. See DEPTH DISTRIBUTION DATA.

Lake George is situated on the southeastern side of the Adirondack Mountains. It is famous for its spectacular scenery and its military significance during both the French and Indian Wars and the American Revolution. It has an overall length of 51 km and a mean width of 2.3 km. Maximum depths of almost 60 m have been recorded off Anthony's Nose and Phelp's Island. The lake is divided near the middle by a channel dotted with islands (The Narrows). The northern basin and perhaps the lake itself is largely spring fed. However, much surface runoff water does enter via streams in the lake's southern basin. The southern basin is also the location of most of the lake's marshland. The single outlet of the lake is at the extreme northern end at Ticonderoga, the water thus flowing north.

Lake George occupies a complex graben in Precambrian bedrock. The sheer slopes and the often linear shorelines are largely due to faulting along this graben. Much of the lake floor glacial or postglacial material is now covered or mixed with modern organic-rich sediments—a suitable substrate for aquatic vegetation. Because of the sheer sloped sides of much of the lake, the littoral zone is most confined to a narrow band around the periphery. Most submergent vegetation is found in 7 m of water or less although *Elodea* has been found as deep as 12 m and *Nitella* (a macrophytic alga) forms a zone throughout the lake between 12 and 15 m. Water transparency is exceptionally high for a freshwater lake, with secchi disc readings commonly 6 to 7 m throughout and values exceeding 13 m off Rogers Rock in the northern basin.

Water chemistry measurements over the last several years as routinely monitored by the Freshwater Institute at Smith Bay show variation within a relatively small range. The pH of the

water column ranges between 6.8 and 7.8. Variation does not appear to be associated with either the southern or northern basins or time of year. Alkalinity measurements range from 16 to 24 mg CaCO_3 /liter throughout Lake George. Interstitial water pH usually approaches neutrality regardless of sediment type, and alkalinity ranges from 20 to 30 mg CaCO_3 /liter. Amounts of nitrogen and phosphorus in the interstitial sediment water are approximately ten times as high as they are in the water above.



KEY TO GENERA

1. Plants tiny (several may be attached together), floating on or near the water surface; without differentiation into stem and leaf
 2. Each plant with a single root; undersurface green *Lemna*
 2. Each plant with several roots; undersurface often purplish *Spirodela*
1. Plants with obvious stem and/or leaves
 3. Stems jointed; leaves whorled, reduced to scales *Equisetum*
 3. Stems not jointed
 4. Leaves basal or essentially so, may be reduced to bladeless sheaths (2nd 4, p. 6)
 5. Leaves compound
 6. Leaves palmate
 7. Leaflets three; reproduction by seeds
 8. Leaves not fleshy; leaflets lobed; flowers yellow *Ranunculus septentrionalis*
 8. Leaves fleshy; leaflets not lobed; flowers white or pink *Menyanthes*
 7. Leaflets more than three; fertile and sterile portions of leaf dissimilar; reproduction by spores *Osmunda regalis*
 6. Leaves pinnate
 9. Leaves with margin entire or essentially so but leaflets may be lobed; reproduction by spores (ferns)
 10. Leaflets 25 or less; sterile and fertile fronds dissimilar *Onoclea*
 10. Leaflets more than 25
 11. Sterile and fertile leaves dissimilar; sterile leaves with brown hairs at base of leaflets; fertile leaves cinnamon-brown, hairy *Osmunda cinnamomea*
 11. Sterile and fertile leaves similar, green, glabrous *Thelypteris*
 9. Leaves with margins of leaflets mostly serrate; reproduction by seeds; inflorescence an umbel
 12. Stems angled; leaves pinnately compound, upper ones once, lower twice; leaflets serrate; fruits with 1 oil tube between each pair of ribs *Sium*
 12. Stems terete; leaves twice or thrice compound, often some of them appearing palmate; leaflets serrate or entire; fruits with 1-3 oil tubes between each pair of ribs *Cicuta*
 5. Leaves simple
 13. Leaves sessile, with no distinction between blade and petiole (2nd 13, p. 5)
 14. Leaves less than twice as broad as thick (2nd 14, p. 4)
 15. Stems and/or leaves arising several from a common base or several from distinct points along a horizontal axis (2nd 15, p. 4)
 16. Leaves with closed sheaths, sometimes bladeless; inflorescence a spike or panicle of spikelets; flowers inconspicuous in the axils of scales; fruit an achene (sedges)
 17. Inflorescence a subterminal spike, a panicle of spikelets, or a close cluster of spikelets that appears to be lateral to the stem *Scirpus*
 17. Inflorescence a terminal spike or cluster of spikelets
 18. Inflorescence with long white bristles; achenes lacking a tubercle *Eriophorum*
 18. Inflorescence without obvious bristles; achenes with a terminal tubercle *Eleocharis*
 16. Leaf sheaths open or absent; inflorescence not a spike nor a cluster of spikelets
 19. Inflorescence many-flowered; flowers 2- or 3-merous
 20. Roots with prominent cross striations; inflorescence a scape with a single head of tiny flowers *Eriocaulon*
 20. Roots without prominent cross striations; inflorescence a raceme or panicle

- 21. Leaves broadly triangular in cross section *Sparganium*
- 21. Leaves terete or nearly so
 - 22. Inflorescence a spikelike raceme, terminal on a long scape; each flower with 6 pistils *Triglochin*
 - 22. Inflorescence a panicle, appearing lateral; each flower with 1 pistil *Juncus effusus*
- 19. Inflorescence few-flowered
 - 23. Plants with rhizomes or stolons
 - 24. Stolons greenish, arching above the soil; stems and leaves without striae; inflorescence single-flowered; flowers with showy yellow petals *Ranunculus reptans*
 - 24. Rhizomes whitish; either stems or leaves with striae; inflorescence of several inconspicuous flowers
 - 25. Stems filiform and leaflike, or uniform thickness, not flattened or cupped at base; stems usually with a delicate membranous, tubular, basal sheath; plants usually green or yellowish green; inflorescence (seldom produced on wholly submersed plants) a terminal spike *Eleocharis acicularis*
 - 25. Leaves gradually tapered to tip, somewhat flattened at base, base of outer leaves cupped around inner leaves; sheathing lower portion of leaf with membranous margins, upper sheath truncate, abruptly tapered, or minutely auricled; plants often with a reddish cast; inflorescence (seldom produced on wholly submersed plants) a spacious cyme *Juncus pelocarpus*
 - 23. Plants with no rhizomes or stolons
 - 26. Roots with prominent cross striations *Eriocaulon*
 - 26. Roots without prominent cross striations
 - 27. Leaves round at apex, with two hollow tubes as seen in cross section; inflorescence a raceme of blue flowers *Lobelia dortmanna*
 - 27. Leaves acute, with 4 or more hollow areas as seen in cross section
 - 28. Leaves with enlarged bases, bearing sporangia and spores, with 4 hollow tubes as seen in cross section; inflorescence never produced *Isoetes*
 - 28. Leaves never with sporangia, the hollow areas more than 4 as seen in cross section; inflorescence a raceme of tiny white flowers on a scape 2-10 cm long, seldom produced when plants are submersed *Subularia*
- 15. Stemlike peduncles arising singly from distinct points along a horizontal axis
 - 29. Stems without bladders; leaves merely small blunt scales; flowers tiny, sessile, greenish *Myriophyllum tenellum*
 - 29. Stems bearing tiny bladders; leaves tiny, straplike and rarely seen; flowers showy, about 10 mm long, violet, on short pedicels *Utricularia resupinata*
- 14. Leaves more than twice as broad as thick
 - 30. Roots less than 1 mm in diam, with prominent cross striations; leaves awl-shaped, ± 5 mm wide at base, tapering rapidly to a slender apex, loosely cellular, often translucent, forming a basal rosette; inflorescence a scape with a single head of tiny 2-merous flowers . . . *Eriocaulon*
 - 30. Roots without prominent cross striations (except sometimes in *Sagittaria*)
 - 31. Leaves stiff, not requiring water for support, less than 20 cm long
 - 32. Leaves round at apex, with 2 hollow tubes as seen in cross section; inflorescence a raceme of blue flowers *Lobelia dortmanna*
 - 32. Leaves acute at apex; inflorescence a raceme of white flowers or an umbel of spikelets
 - 33. Stems terete; leaves thick with open sheathing base; inflorescence a raceme of white flowers *Sagittaria*
 - 33. Stems triangular; leaves thin, with closed sheath; inflorescence an umbel of spikelets *Cyperus*
 - 31. Leaves limp; requiring water for support, ribbonlike, more than 20 cm long
 - 34. Leaves with midvein not evident, longitudinal and cross veins numerous giving the leaf a checkered appearance with squares or short rectangles (some plants of *Pontederia cordata* forma *taenia* may key to this point); male and female flowers in separate spherical heads, monoecious *Sparganium*

- 34. Leaves with an evident midvein, cross veins widely separated; flowers not in heads
- 35. Leaves with a dense middle area bordering the midrib and with translucent marginal areas that lack longitudinal veins; plants dioecious; flowers borne singly, female flowers on long coiled peduncles, male flowers sessile or on very short peduncles, both peduncles from a basal rosette *Vallisneria*
- 35. Leaves with translucent areas between the narrow midrib and the margins; inflorescence a raceme of showy white flowers *Sagittaria cuneata*
- 13. Leaves with distinct petiole and blade
- 36. Leaf blades stiff and erect, not requiring water for support
- 37. Leaf blades with 2 basal lobes, cordate or sagittate
- 38. Leaf blades with basal lobes acute
- 39. Leaves with 3 prominent veins from the juncture of the petiole and blade and with many lateral veins from the midvein to the margins; inflorescence a spadix in a green spathe; flowers with no petals *Peltandra*
- 39. Leaves with many veins from the juncture of the petiole and blade, with no veins from midvein to margins; inflorescence a raceme with pedicels in whorls of 3; flowers with showy white petals *Sagittaria*
- 38. Leaf blades with basal lobes rounded
- 40. Leaves round at apex, venation netted
- 41. Odor not skunky; leaf margins toothed; inflorescence of large pedicelled yellow flowers *Caltha*
- 41. Odor skunky; leaf margins entire; inflorescence of tiny sessile flowers on a spadix in a fleshy spathe *Symplocarpus*
- 40. Leaves acute at apex, margin entire, venation parallel; flowers not yellow
- 42. Plants up to 30 cm tall; leaf blades about as long as wide, apex with a sharp point; stems a horizontal rhizome only; inflorescence a spadix subtended by a large white spathe; fruits fleshy, red *Calla*
- 42. Plants up to 100 cm tall; leaf blades mostly much longer than wide, apex with a blunt point; stems a thick horizontal rhizome with vertical stems each bearing a single foliage leaf; inflorescence a spikelike panicle subtended by a small green spathe; flowers blue; fruits dry, brownish *Pontederia*
- 37. Leaf blades neither sagittate nor cordate
- 43. Leaf blades deeply lobed, nearly compound *Ranunculus septentrionalis*
- 43. Leaf blades not lobed
- 44. Leaf blades with hollow trumpet-shaped leaves *Sarracenia*
- 44. Leaf blades not trumpet-shaped
- 45. Leaves with long glandular hairs *Drosera*
- 45. Leaves glabrous
- 46. Plants creeping, rooting at the nodes; flowers yellow *Ranunculus reptans*
- 46. Plants erect; flowers white or blue
- 47. Petioles with central hollow cavity *Pontederia*
- 47. Petioles with spongy central area
- 48. Leaf blades mostly less than twice as long as wide, rounded at base, all flowers bisexual; fruits in a single whorl on the receptacle, forming a disk *Alisma*
- 48. Leaf blades mostly more than twice as long as broad, tapering to the petiole; most flowers unisexual, male above, female below; fruits attached all over the receptacle, forming a globose structure *Sagittaria*
- 36. Leaf blades floating on the water surface, requiring water for support
- 49. Floating leaf blades sagittate; submersed ribbon-shaped leaves may be present; inflorescence a raceme *Sagittaria cuneata*
- 49. Leaf blades cordate; inflorescence a single flower or flowers clustered to form an umbel
- 50. Leaf blades mostly less than 5 cm long, several principal veins equally strong, branching and recurving to unite with each other; some leaves appearing to be basal, others

- from a slender, limp stem bearing a cluster of fleshy roots or flowers or both at the base of the petiole near the water surface *Nymphoides*
50. Leaf blades mostly more than 3 cm long, central vein more prominent than other veins, forking but not uniting; petioles and peduncles from a basal rhizome; flowers borne singly
51. Leaf blades about as long as wide, with more veins from the base of the midrib than from along the midrib, veins much forked; petioles and peduncles with 4 large hollow areas as seen in cross section; flowers white *Nymphaea*
51. Leaf blades with more veins from the midrib than from the base of midrib, veins little forked; petioles and peduncles with many small hollow areas; flowers yellow *Nuphar*
4. Leaves cauline or essentially so
52. Leaves linear
53. Leaves stiff, not requiring water for support
54. Leaves with parallel veins
55. Leaves with basal sheaths closed, or if open then with a ligule at the juncture of sheath and blade
56. Leaf sheaths several times as wide as the stem, basal sheaths overlapping, cauline leaves 1-3, not overlapping; inflorescence a terminal few-flowered raceme; each fruit composed of 3 follicles *Scheuchzeria*
56. Leaf sheaths scarcely wider than the stem; inflorescence a group of spikelets; fruit an achene or caryopsis
57. Leaf sheaths open (except *Glyceria*); stem internodes with hollow pith; leaves 2-ranked, with a ligule at the juncture of sheath and blade; fruit a caryopsis (grasses)
58. Inflorescence with spikelets closely aggregated to form a narrow spikelike panicle
59. Plants usually less than 70 cm tall; spikelets in a dense spikelike panicle; spikelets with sterile flowers or glumes attached above the fertile flower *Alopecurus*
59. Plants usually more than 60 cm tall; spikelets in a loose spikelike panicle; spikelets with sterile flowers or glumes attached below the fertile flower *Phalaris*
58. Inflorescence with spikelets widely spaced to form an open panicle
60. Plants without rhizome; staminate spikelets below and distinctly separated from the pistillate spikelets *Zizanea*
60. Plants with rhizomes (except *Puccinellia*); with no distinct separation of staminate and pistillate spikelets
61. Plants 2-4 m tall; spikelets with long silky hairs giving a silky appearance to the whole inflorescence *Phragmites*
61. Plants less than 2 m tall; spikelets without conspicuous hairs
62. Each spikelet with several florets
63. Leaf sheaths closed; rhizomes present; second glume with one distinct vein *Glyceria*
63. Leaf sheaths open; rhizomes absent; second glume with 3 veins ... *Puccinellia*
62. Each spikelet with a single floret; leaf sheaths open
64. Leaf margins with fine sharp teeth; panicle pale green to whitish; spikelets 4-5 mm long; glumes absent; lemma pilose, ciliate on the keel but without long basal hairs *Leersia*
64. Leaf margins without sharp teeth; panicle often purplish; spikelets 3-3.5 mm long; glumes present; with copious long hairs around the base of the lemma *Calamagrostis*
57. Leaf sheaths closed; stem internodes with solid or spongy pith (except *Dulichium*); leaves 3-ranked, with no ligule; fruit an achene (sedges)

- 65. Spikelets with long, exserted, silky bristles subtending the achenes, giving the inflorescence a cottony appearance *Eriophorum*
- 65. Inflorescence without long exserted bristles
 - 66. Inflorescence a terminal umbel of spikelets
 - 67. Scales of spikelets 2-ranked *Cyperus*
 - 67. Scales of spikelets spirally imbricated *Scirpus*
 - 66. Inflorescence not an umbel
 - 68. Stem internodes hollow; spikelets axillary on the stem *Dulichium*
 - 68. Stem with solid or spongy pith
 - 69. Florets unisexual; achenes enclosed in a sac (perigynium) *Carex*
 - 69. Florets bisexual; achenes not in a sac
 - 70. Achenes with a tubercle (persistent style base) at the apex; perianth bristles 8-14 *Rhynchospora*
 - 70. Achenes without a tubercle; perianth bristles usually 1-6 *Scirpus*
- 55. Leaves without basal sheath, or if sheath present then with sheath open and without a ligule
 - 71. Leaves less than 3 mm wide; flowers bisexual, radially symmetrical; fruit a capsule, less than 10 mm long *Juncus*
 - 71. Leaves more than 5 mm wide; fruit an achene or, if a capsule, then more than 30 mm long
 - 72. Leaves with a keeled midrib; flowers in pistillate and staminate globose heads *Sparganium*
 - 72. Leaves without prominent midrib; inflorescence a spike or a single flower
 - 73. Leaf sheaths abruptly narrowed to blade; inflorescence a spike; flowers tiny; fruits an achene *Typha*
 - 73. Leaf sheath tapered to blade; flowers large and showy; fruit a capsule *Iris*
- 54. Leaves with netted veins
 - 74. Leaves whorled; stems 4-angled; flowers 3- or 4-merous; fruits spherical and paired *Galium*
 - 74. Leaves not whorled; stems terete or 3-angled; flowers 5-merous; fruits not spherical or paired
 - 75. Stems 3-angled; flowers borne singly, bell-shaped *Campanula*
 - 75. Stems terete or nearly so; flowers in heads
 - 76. Inflorescence flat-topped; flowers yellow *Solidago*
 - 76. Inflorescence not flat-topped; flowers not yellow *Aster*
- 53. Plants limp and flaccid, requiring water for support
 - 77. Leaves opposite or whorled
 - 78. Leaves whorled; flowers and fruits (both rarely seen) on long filamentous stalks *Elodea*
 - 78. Leaves opposite; flowers and fruits sessile in the leaf axils
 - 79. Lower submersed leaves linear, bidentate at apex, tapering to a sessile base; upper and floating leaves spatulate to ovate; fruits heart-shaped with 4 seeds *Callitriche*
 - 79. Leaves all linear and submersed, apex acute, base broad and semiclasping or with sheathing stipules; fruits with 1 seed
 - 80. Leaves 15-40 mm long, 0.5-1 mm wide at base above the lobes, tapering gradually to the apex; fruits borne singly in the leaf axils, terete and tapering to both ends *Najas*
 - 80. Leaves 30-100 mm long, less than 0.5 mm wide, sides parallel; fruits with a long beak, often toothed on one side, 2-5 in an axil *Zannichellia*
 - 77. Leaves alternate
 - 81. Leaves to 150 cm long, with midvein not evident, longitudinal and cross veins numerous giving the leaf a checkered appearance with squares and short rectangles, stipules absent; flowers unisexual in globose heads *Sparganium*

- 81. Leaves less than 30 cm long, stipules present (may disappear with age); flowers bisexual, borne singly or in cylindrical or globose spikes
- 82. Leaves several times as wide as thick, with no definite midvein, stipules adnate to the leaf base; flowers (rarely seen) borne singly, 3-merous, pale yellow*Heteranthera*
- 82. Leaves with an evident midvein, except for those which are very narrow and scarcely wider than thick; stipules adnate or free; flowers borne in spikes, 4-merous, greenish or brownish*Potamogeton*
- 52. Leaves broad
 - 83. Leaves opposite or whorled
 - 84. Plants stiff, not requiring water for support
 - 85. Stems terete or nearly so
 - 86. Leaf margins entire
 - 87. Leaves sessile
 - 88. Leaves with transparent dots
 - 89. Flowers yellow, without glands between the groups of stamens*Hypericum*
 - 89. Flowers pinkish or greenish, with three orange glands alternating with the three groups of stamens*Triadenum*
 - 88. Leaves without transparent dots (opaque dots may be present)
 - 90. Plants 10-30 cm tall; stems soft; flowers bilaterally symmetrical*Gratiola*
 - 90. Plants 40-120 cm tall; stems firm; flowers radially symmetrical
 - 91. Larger leaves slightly cordate; inflorescence a spike; flowers reddish-purple, trimorphic*Lythrum*
 - 91. Leaves never cordate; inflorescence a raceme; flowers yellow, not trimorphic*Lysimachia*
 - 87. Leaves petioled
 - 92. Plants delicate, erect or decumbent; leaves less than 4 cm long; flowers tiny, sessile in the leaf axils*Ludwigia*
 - 92. Plants firm, erect; inflorescence large and showy
 - 93. Plants with milky sap; inflorescence an umbel; flowers pink*Asclepias*
 - 93. Plants without milky sap; inflorescence a raceme; flowers yellow .*Lysimachia terrestris*
 - 86. Leaf margins serrate
 - 94. Leaves connate or whorled*Eupatorium*
 - 94. Leaves opposite, not connate
 - 95. Plants decumbent; leaves linear lanceolate; inflorescence a raceme; flowers violet; fruits a notched capsule*Veronica*
 - 95. Plants erect or essentially so; inflorescence not a raceme
 - 96. Plants 10-30 cm tall; leaves obovate; flowers borne singly in the leaf axils, white tinged with purple; fruits a globose capsule*Gratiola*
 - 96. Inflorescence a spike or a head
 - 97. Inflorescence a terminal spike; flowers white*Chelone*
 - 97. Inflorescence a head; flowers yellow*Bidens*
 - 85. Stems 4- or 6-angled
 - 98. Leaf margins entire; leaves opposite or in threes (some near inflorescence may be alternate); stems corky; flowers purple*Decodon*
 - 98. Leaf margins with teeth; stems not corky
 - 99. Leaves whorled, mostly in fours or sixes; flowers white*Galium*
 - 99. Leaves opposite
 - 100. Flowers borne singly or in loose racemes in the leaf axil
 - 101. Plants 10-30 cm tall; leaves 1-3 cm long; flowers pale lavender, 7-10 mm long*Lindernia*
 - 101. Plants 30-100 cm tall; leaves 3-10 cm long; flowers blue
 - 102. Leaves sessile; flowers borne singly in the leaf axils on pedicels 2-4 cm long; fruits a capsule with many seeds*Mimulus*

- 102. Leaves with petioles 1-20 mm long; flowers in racemes or singly on pedicels less than a cm long; fruits forming 4 nutlets in each flower*Scutellaria*
- 100. Flowers borne in dense axillary clusters or terminal spikes
 - 103. Plants fragrant; tubers absent; flowers bluish-pink; stamens 4*Mentha*
 - 103. Plants not fragrant; tubers sometimes present; flowers white; stamens 2*Lycopus*
- 84. Plants flaccid, requiring water for support, or prostrate
 - 104. Leaves simple
 - 105. Leaves 4 mm or less wide, sessile, with 1 vein; flowers in the leaf axils*Elatine*
 - 105. Leaves, at least some of them 5 mm or more wide, petioled
 - 106. Upper leaves broad, forming a small rosette at the water surface, lower ones linear*Callitriche*
 - 106. All leaves broad
 - 107. Stems trailing; flowers in the leaf axils, 20-30 mm wide, yellow, 5-merous, on pedicels 10-25 mm long*Lysimachia nummularia*
 - 107. Some stems upright from a horizontal rhizome; flowers small, 4-merous, sessile or nearly so
 - 108. Flowers terminal on the branches*Chrysosplenium*
 - 108. Flowers in the leaf axils*Ludwigia*
 - 104. Leaves dissected
 - 109. Leaves with bladders; flowers showy, bilaterally symmetrical*Utricularia*
 - 109. Leaves without bladders; flowers radially symmetrical
 - 110. Leaves pinnately divided*Myriophyllum*
 - 110. Leaves forked
 - 111. Plants without roots; all leaves submersed, lobes usually toothed on one side (plants lacking teeth might be confused with *Bidens*); flowers tiny, in the leaf axils*Ceratophyllum*
 - 111. Plants rooted; with or without emerged leaves, lobes entire; flowers in a showy head with yellow rays*Bidens beckii*
- 83. Leaves alternate
 - 112. Leaves peltate, floating plants usually with gelatinous coating*Brasenia*
 - 112. Leaves not peltate
 - 113. Floating leaves with inflated petioles; submersed leaves pinnately dissected*Trapa*
 - 113. Leaves without inflated petioles
 - 114. With a cluster of thick, tuberlike roots near the water surface at the juncture of the petiole and stem; leaves cordate*Nymphoides*
 - 114. With no thick roots near the water surface
 - 115. Plants flaccid, requiring water for support, or creeping mats
 - 116. Leaves compound with broad leaflets; flowers about 2 cm wide, 5-merous; petals red-purple*Potentilla*
 - 116. Leaves simple or compound with narrow leaflets or dissections
 - 117. Leaves with parallel veins, with a stipule in the axil of the stem and leaf; inflorescence a spike; flowers small, greenish, 4-merous*Potamogeton*
 - 117. Leaves with netted veins
 - 118. Leaves palmately veined
 - 119. Petioles as long or longer than the blades; inflorescence a tiny axillary umbel*Hydrocotyle*
 - 119. Petioles much shorter than the blade; flowers solitary, on a long pedicel*Ranunculus*
 - 118. Leaves pinnately veined
 - 120. Leaf margins entire; with a tubular sheath (ocrea) at the base of each petiole; inflorescence a spike with rose-colored flowers*Polygonum*
 - 120. Leaf margins shallowly to coarsely toothed; with no tubular sheath; inflorescence not a spike
 - 121. Leaves less than 2 cm long, with a short petiole, shallowly toothed; flowers solitary, terminal, 4-merous*Chrysosplenium*

- 121. Leaves more than 2 cm long, sessile, coarsely toothed; flowers axillary, solitary or in clusters, 3-merous *Proserpinaca*
- 115. Plants stiff, not requiring water for support
- 122. Leaves compound
 - 123. Leaves once compound; inflorescence 1- to several-flowered;
 - 124. Leaflets 3, terminal one stalked; flowers yellow *Ranunculus septentrionalis*
 - 124. Leaflets 5 or more; flowers not yellow
 - 125. Petiole with broad base that encircles the stem; flowers 5-merous, red-purple *Potentilla*
 - 125. Petiole without broad base; flowers 4-merous, white or pink *Cardamine*
 - 123. Leaves twice or thrice compound; inflorescence an umbel; flowers white
 - 126. Stems angled; leaves pinnately compound, upper ones once, lower twice; leaflets serrate; fruits with 1 oil tube between each pair of ribs *Sium*
 - 126. Stems terete; leaves twice or thrice compound, often some of them appearing to be palmate; leaflets serrate or entire; fruits with 1-3 oil tubes between each pair of ribs . *Cicuta*
- 122. Leaves simple, may be deeply lobed
 - 127. With short cylindric stipules sheathing the stem at the nodes (ocreae), may be reduced to fibers in *Rumex*; flowers whitish, greenish, or rose
 - 128. Flowers sessile, forming a spike *Polygonum*
 - 128. Flowers on pedicels in whorls *Rumex*
 - 127. Ocreae absent
 - 129. Leaves cordate
 - 130. Stems with one cauline leaf; leaves with parallel veins, margins smooth; inflorescence a showy spike of blue flowers *Pontederia*
 - 130. Stems with more than one cauline leaf; leaves with netted veins; margins scalloped; flowers yellow or white
 - 131. Leaves mostly more than 10 cm wide; flowers yellow *Caltha*
 - 131. Leaves mostly less than 5 cm wide; flowers white *Hydrocotyle*
 - 129. Leaves not cordate
 - 132. Flowers in heads *Aster*
 - 132. Flowers not in heads
 - 133. Leaf margins entire, may be lobed
 - 134. Leaves sessile, not lobed; flowers blue with yellow spot in center; fruits 4-lobed, becoming 4 nutlets *Myosotis*
 - 134. Leaves petiolate, with or without lobes; flowers violet or purple; fruits a berry *Solanum*
 - 133. Leaf margins toothed
 - 135. Leaves lobed; flowers yellow; fruits a silique *Rorippa*
 - 135. Leaves not lobed; flowers not yellow; fruits a follicle or capsule
 - 136. Inflorescence a cyme, coiled when young, straightening as flowers open; flowers greenish; fruits a follicle *Penthorum*
 - 136. Inflorescence a raceme of showy blue or scarlet flowers; fruits a capsule *Lobelia*

CHECKLIST

ISOETACEAE

ISOETES QUILLWORT

echinospora subsp. *braunii* (*I. muricata*) Fig. 2.

macrospora Fig. 1.

1. Megaspores spinulose, 0.3-0.6 mm in diam. *I. echinospora*
1. Megaspores reticulate, 0.5-0.8 mm in diam. *I. macrospora*

EQUISETACEAE

EQUISETUM HORSETAIL

fluvatile Fig. 3. Lake outlet; Red Rock Bay; Harris Bay

palustre Fig. 4. Harris Bay swamp

1. Central cavity of stem about 4/5 the diameter of the stem *E. fluvatile*
1. Central cavity about 1/6 the diameter of the stem *E. palustre*

OSMUNDACEAE

OSMUNDA

cinnamomea CINNAMON FERN Fig. 5. Big Burnt I.; Northwest Bay;

Pilot Knob; Speaker Heck I.; Warner Bay; Harris Bay; Dunham Bay

regalis var. *spectabilis* ROYAL FERN Fig. 6.

1. Leaves once pinnate *O. cinnamomea*
1. Leaves twice pinnate *O. regalis*

POLYPODIACEAE

ONOCLEA

sensibilis SENSITIVE FERN Fig. 7.

THELYPTERIS

palustris var. *pubescens* (*Dryopteris thelypteris*) MARSH FERN Fig. 8.

TYPHACEAE

TYPHA CATTAIL

angustifolia NARROW-LEAVED CATTAIL Fig. 10. Lake outlet;

N end of lake; Black Pt; Harris Bay; Dunham Bay

× *glauc*a (= *T. angustifolia* × *latifolia*) Fig. 11. Lake outlet;

Harris Bay; Dunham Bay

latifolia BROAD-LEAVED CATTAIL Fig. 9. Lake outlet; Cooper Pt;

Northwest Bay; Warner Bay; Harris Bay; Dunham Bay

1. Stigmas lance-ovate; pistillate and staminate parts of spike usually contiguous; pollen grains in tetrads *T. latifolia*
1. Stigmas linear to lance-linear; pistillate and staminate parts of spike usually separated; pollen grains single
2. Stigmas lance-linear; pistillate and staminate parts of spike contiguous or separated by an interval up to 4 cm (usually less than the diameter of the pistillate spike); leaves mostly 7-12 mm wide *T. × glauc*a



Fig. 1. *Isoetes echinospora*; Fig. 2. *I. macrospora*; Fig. 3. *Equisetum fluviatile*; Fig. 4. *E. palustre*; Fig. 5. *Osunda cinnamomea*; Fig. 6. *O. regalis*; Fig. 7. *Onoclea sensibilis*; Fig. 8. *Thelypteris palustris*.

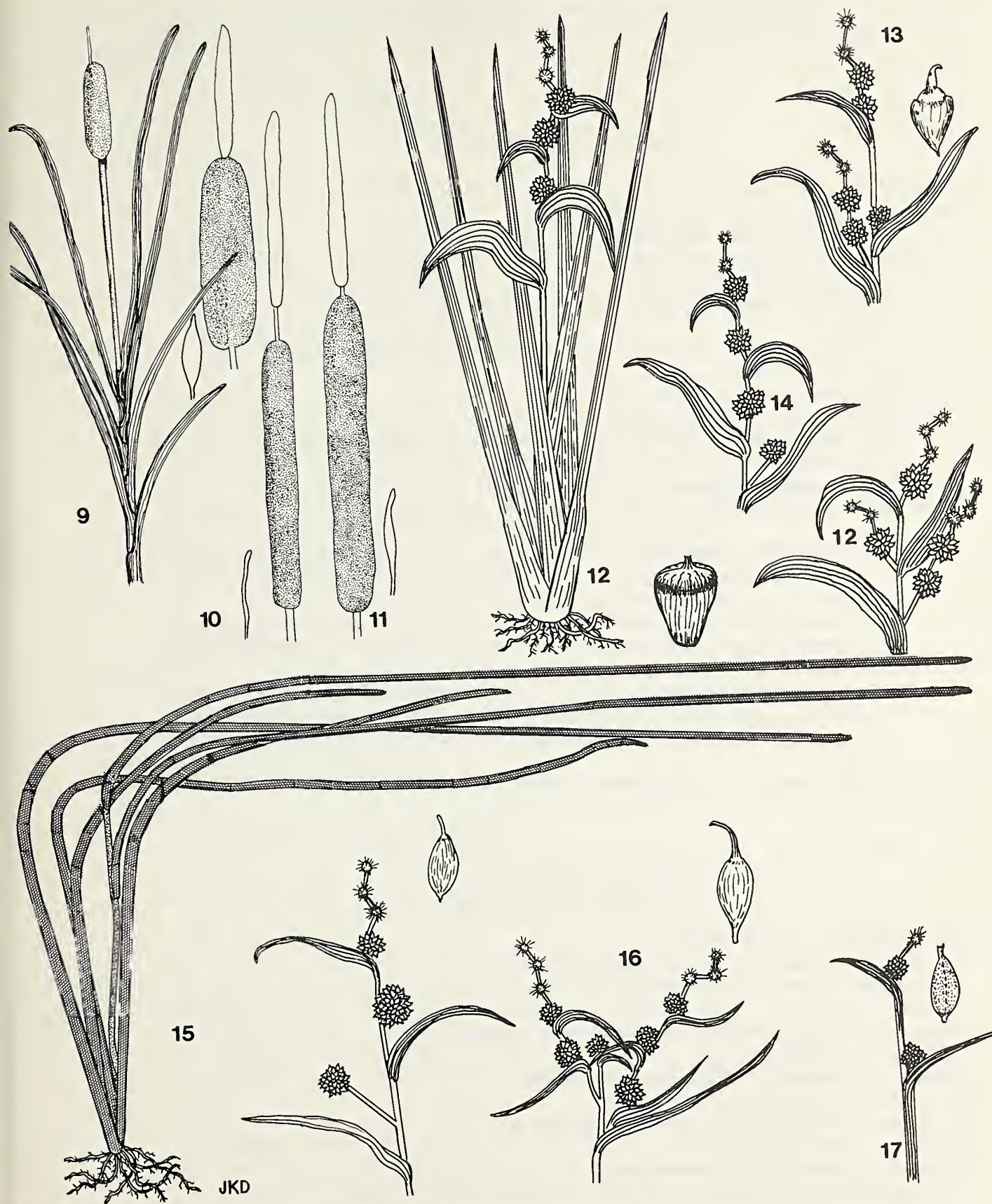


Fig. 9. *Typha latifolia*; Fig. 10. *T. angustifolia*; Fig. 11. *T. x glauca*; Fig. 12. *Sparganium eurycarpum*; Fig. 13. *S. americanum*; Fig. 14. *S. chlorocarpum*; Fig. 15. *S. angustifolium*; Fig. 16. *S. fluctuans*; Fig. 17. *S. minimum*.

2. Stigmas linear; pistillate and staminate parts of spike separated by an interval of 0.5-12 cm (usually about twice the diameter of the pistillate spike); leaves mostly 4-8 mm wide
.....*T. angustifolia*

SPARGANIACEAE

SPARGANIUM BUR REED

americanum Fig. 13. N end of lake; Northwest Bay;

Shelving Rock; Bolton Ldg; Dunham Bay

angustifolium Fig. 15. Harris Bay. This species and/or *S. fluctuans* found sterile throughout and impossible to distinguish with certainty.

chlorocarpum Fig. 14. Northwest Bay; Warner Bay; Dunham Bay

eurycarpum Fig. 12.

fluctuans Fig. 16. Northwest Bay; Warner Bay. See note under *S. angustifolium*.

minimum Fig. 17. Dunham Bay

1. Stigmas 2; fruit 4-8 mm wide, usually with 2 seeds*S. eurycarpum*
1. Stigma 1; fruit 1-3 mm wide, with 1 seed
 2. Pistillate heads more than 12 mm in diameter; staminate heads 2 or more; beak of fruit about as long as ovary
 3. Plants erect with upper leaves emersed
 4. Pistillate heads axillary (from the axils of bracts); upper part of fruit usually dull
.....*S. americanum*
 4. One or more of the pistillate heads supra-axillary (on the peduncle above the axil); upper part of fruit usually shiny*S. chlorocarpum*
 3. Plants flaccid with upper leaves floating and often very long
 5. Inflorescence branched; pistillate heads axillary; mature fruit dark with firm pericarp; beak strongly curved; sepals attached near base or middle of fruit stalk; leaves 3-10 mm wide, usually flattish on both sides*S. fluctuans*
 5. Inflorescence unbranched; one or more pistillate heads supra-axillary; mature fruit brownish or greenish with loose pericarp; beak straight or slightly curved; sepals attached near the summit of fruit stalk; leaves 2-5 mm wide, usually rounded on the back*S. angustifolium*
 2. Pistillate heads about 10 mm in diameter; staminate heads 1 (rarely 2); beak of fruit short
.....*S. minimum*

POTAMOGETONACEAE

POTAMOGETON PONDWEED

alpinus var. *tenuifolius* Fig. 22. Northwest Bay stream;

Shelving Rock; Warner Bay; Dunham Bay

amplifolius Fig. 19.

crispus Fig. 18. Hague; Gull Bay; Smith Bay; Lamb Shanty

Bay; Tea I.; S end of lake

epihydrus var. *ramosus* (*P. e.* var. *nuttallii*) Fig. 31.

foliosus Fig. 32. Lake outlet; Dunham Bay

friesii Fig. 34. Shelving Rock; Warner Bay; Dunham Bay

gramineus Fig. 21.

illinoensis (*P. angustifolius*, *P. lucens*) Fig. 24.

Lake outlet; N end of lake; bay N of Black Pt; Weeds Bay; Warner Bay

natans Fig. 20.

obtusifolius Fig. 36. Dunham Bay

13. Submersed leaves petioled or sessile but not clasping; floating leaves often present
 14. Submersed leaves sessile, apex obtuse; floating leaves delicate, blade tapering without sharp distinction into the petiole; fruit wall hard and smooth, tawny-olive *P. alpinus*
 14. Submersed leaves sessile or petioled, apex obtuse or acute; floating leaves coriaceous, blade distinct from petiole; fruit wall spongy, greenish, brownish, or reddish
 15. Submersed leaves, usually arcuate, with 19-37 veins; floating leaf blades mostly with more than 30 veins; fruits mostly more than 3.5 mm long *P. amplifolius*
 15. Submersed leaves seldom arcuate, with 3-19 veins; floating leaf blades mostly with less than 30 veins; fruits mostly less than 3.5 mm long
 16. Stem usually much branched; submersed leaves 2-15 mm wide, sessile, with 3-9 veins; floating leaf petioles mostly longer than the blades; fruiting spikes 10-25 mm long; fruits 1.7-2.8 mm long *P. gramineus*
 16. Stem simple or once branched; submersed leaves 15-40 mm wide, sessile or petioled, with 9-17 veins; floating leaf petioles mostly shorter than the blades; fruiting spikes 25-60 mm long; fruits 2.5-3.5 mm long *P. illinoensis*
13. Leaves all submersed, cordate or rounded at base and clasping the stem
 17. Leaves ovate-oblong, mostly 10-20 cm long, apex boatshaped, splitting when flattened; stipules persistent; stem often whitish; fruits more than 4 mm long *P. praelongus*
 17. Leaves ovate or elongate ovate, 1-10 cm long, apex not boatshaped; stipules at maturity inconspicuous or disintegrated to fibers; stem greenish; fruits less than 3.5 mm long
 18. Stipules coarse, disintegrating to persistent whitish fibers; peduncles clavate; fruits with a cavity in the endocarp loop *P. richardsonii*
 18. Stipules delicate, disappearing with age; peduncles not clavate; fruits without a cavity in the endocarp loop *P. perfoliatus*

ZANNICHELLIACEAE

ZANNICHELLIA HORNED PONDWEED

palustris Fig. 37. Lake outlet; Gull Bay

NAJADACEAE

NAJAS NAIAD

flexilis Fig. 38.

SCHEUCHZERIACEAE

SCHEUCHZERIA

palustris subsp. *americana* Fig. 39. East Lake George marsh

JUNCAGINACEAE

TRIGLOCHIN ARROW GRASS

maritima var. *elata* Fig. 40. East Lake George marsh near Brayton

ALISMATACEAE

ALISMA WATER PLANTAIN

plantago-aquatica subsp. *subcordatum* (*A. p.-a.* var. *parviflorum*) Fig. 41. Lake outlet; Little Harbor Island; Bolton Ldg; Dunham Bay marsh



Fig. 18. *Potamogeton crispus*; Fig. 19. *P. amplifolius*; Fig. 20. *P. natans*; Fig. 21. *P. gramineus*; Fig. 22. *P. alpinus*; Fig. 23. *P. perfoliatus*; Fig. 24. *P. illinoensis*; Fig. 25. *P. richardsonii*; Fig. 26. *P. praelongus*.



Fig. 27. *Potamogeton robbinsii*; Fig. 28. *P. pectinatus*; Fig. 29. *P. vaseyi*; Fig. 30. *P. spirillus*; Fig. 31. *P. epiphydrus*; Fig. 32. *P. foliosus*; Fig. 33. *P. pusillus*; Fig. 34. *P. friesii*; Fig. 35. *P. zosteriformis*; Fig. 36. *P. obtusifolius*.



Fig. 37. *Zannichellia palustris*; Fig. 38. *Najas flexilis*; Fig. 39. *Scheuchzeria palustris*; Fig. 40. *Triglochin maritima*; Fig. 41. *Alisma plantago-aquatica*; Fig. 42. *Sagittaria latifolia*; Fig. 43. *S. rigida*; Fig. 44. *S. graminea*; Fig. 45. *S. cuneata*; Fig. 46. *Elodea canadensis*; Fig. 47. *Vallisneria americana*.

SAGITTARIA ARROWHEAD

cuneata (*S. arifolia*) Fig. 45.

graminea Fig. 44. Sterile emersed plants similar to *S. rigida*.

latifolia Fig. 42.

rigida Fig. 43. See note under *S. graminea*.

1. Most leaves sagittate
 2. Pistillate flowers on definite pedicels
 3. Leaves stiff and erect; beak of achene horizontal *S. latifolia*
 3. Leaves usually flaccid, often of two kinds (submersed ribbonlike, floating sagittate) beak of achene nearly erect *S. cuneata*
 2. Pistillate flowers sessile or nearly so *S. rigida*
1. Most leaves not sagittate
 4. Pistillate flowers sessile or nearly so; peduncles strongly bent above the lowest flowers; achenes 3-4 mm long *S. rigida*
 4. Pistillate flowers on definite pedicels; peduncles straight or nearly so; achenes about 1 mm long *S. graminea*

HYDROCHARITACEAE

ELODEA ELODEA, WATERWEED

canadensis (*Anacharis c.*, *Philotria c.*) Fig. 46.

VALLISNERIA DUCK CELERY, FRESH WATER EEL GRASS

americana (*V. spiralis*) Fig. 47.

GRAMINEAE

ALOPECURUS FOXTAIL

aequalis (*A. aristulatus*) Fig. 48. Warner Bay; Dunham Bay; Bloody Pond

CALAMAGROSTIS

canadensis BLUEPOINT GRASS Fig. 49. Warner Bay; Harris Bay; Dunham Bay

GLYCERIA MANNA GRASS

borealis (*Panicularia b.*) Fig. 50.

canadensis (*Panicularia c.*) Fig. 53. Bloody Pond

maxima subsp. *grandis* (*Panicularia g.*) Fig. 51.

Lake outlet; Sabbath Day Pt; Lake George village

striata (*G. nervata*, *Panicularia s.*, *P. n.*) Fig. 52. Lake outlet; Harris Bay; Bloody Pond

1. Spikelets 10 mm or more long, cylindrical; panicle narrow and erect *G. borealis*
1. Spikelets 7 mm or less long, flattened, panicle spreading and nodding
 2. Spikelets 3-4 mm wide; veins of lemma inconspicuous *G. canadensis*
 2. Spikelets less than 3 mm wide; veins of lemma conspicuous
 3. Leaves 6-12 mm wide; spikelets 4-7 mm long; first glume 1-2 mm long; second glume 1.5-2.5 mm long *G. maxima*
 3. Leaves 2-5 (-8) mm wide; spikelets 3-4 mm long; first glume 0.6-1 mm long; second glume 0.8-1.3 mm long *G. striata*

LEERSIA

oryzoides (*Homalocenchrus o.*) CUT GRASS Fig. 55. Lake outlet; Black Pt Bay; Dunham Bay

PHALARIS

arundinacea REED CANARY GRASS Fig. 56. Bolton Ldg; Diamond Pt; Harris Bay; Dunham Bay

PHRAGMITES

australis (*P. communis*, *P. maximus*, *P. phragmites*) GIANT REED GRASS Fig. 57. East Lake George marsh; Dunham Bay



Fig. 48. *Alopecurus aequalis*; Fig. 49. *Calamagrostis canadensis*; Fig. 50. *Glyceria borealis*; Fig. 51. *G. maxima*; Fig. 52. *G. striata*; Fig. 53. *G. canadensis*; Fig. 54. *Puccinellia pallida*; Fig. 55. *Leersia oryzoides*; Fig. 56. *Phalaris arundinacea*; Fig. 57. *Phragmites australis*; Fig. 58. *Zizania aquatica*; Fig. 59. *Z. palustris*.

PUCCINELLIA

pallida (*Glyceria* p., *Panicularia* p.) Fig. 54. Bolton Ldg; Harris Bay; Dunham Bay

ZIZANIA WILD RICE

aquatica (*Z. palustris*) Fig. 58. Harris Bay; Dunham Bay

palustris (*Z. aquatica*, *Z. a.* var. *angustifolia*) Fig. 59. Harris Bay; Dunham Bay

1. Pistillate lemmas thin, delicately ribbed, with scattered strigose hairs on the surface or glabrous *Z. aquatica*
1. Pistillate lemmas coarsely corrugated; with hairs only between the ribs *Z. palustris*

CYPERACEAE

CAREX SEDGE

alata Fig. 64. East Lake George marsh; Dunham Bay

bebbii Fig. 65. Pilot Knob; Harris Bay swamp; Dunham Bay

canescens Fig. 75. Northwest Bay; Warner Bay; Harris Bay; Dunham Bay

chordorrhiza Fig. 74. East Lake George marsh

comosa Fig. 78.

crinata Fig. 85. Smith Bay; Northwest Bay; Harris Bay swamp

cristatella Fig. 66. Lake outlet; N of Bolton; Pilot Knob; Warner Bay; Harris Bay; Dunham Bay

diandra Fig. 72. Warner Bay; Brayton; Harris Bay; Dunham Bay

exilis Fig. 60. East Lake George marsh; Harris Bay bog mat

flava Fig. 92. Brayton

gynandra (*C. crinata* var. *g.*) Fig. 84. Hague; Tongue Mt; Pilot Knob; Brayton; Harris Bay

howei Fig. 61. Brayton

hystericina Fig. 81.

interior Fig. 62. Harris Bay swamp; marsh S of Lake George village

intumescens Dunham Bay

intumescens var. *fernaldii* Fig. 90. Boon Bay; Basin Bay; Brayton; Harris Bay

lacustris Fig. 86. Northwest Bay; Dunham Bay

lanuginosa Fig. 88. Dunham Bay

lasiocarpa subsp. *americana* Fig. 89. Lake outlet; Dunham Bay

leptalea Fig. 77. Pilot Knob

limosa Fig. 83. Brayton; Dunham Bay

lupulina Fig. 91. Cotton Pt; Pilot Knob; Dunham Bay

lurida Fig. 80. Lake outlet; Dunham Bay

magellanica subsp. *irrigua* (*C. paupercula*) Fig. 82. swamp east of Harris Bay marsh

muricata var. *angustata* (*C. angustior*) Diamond Point; Harris Bay

muricata var. *cephalantha* Fig. 63.

normalis Fig. 67. Harris Bay; Lake George village

prairea Fig. 73. Abandoned road east of Harris Bay marsh

projecta Fig. 68. Pilot Knob

pseudocyperus Fig. 79. Northwest Bay; Dunham Bay

rostrata Fig. 93. Cotton Pt; Northwest Bay; Dunham Bay

scabrata Fig. 94. Hague

stipata Fig. 70.

stricta (*C. strictior*) Fig. 87. Typical form throughout. A form with drooping pistillate spikes found on Harris Bay bog mat. This may be *C. stricta* forma *xerocarpa*.

tenuiflora Fig. 76. East Lake George marsh

tribuloides Fig. 69. Pilot Knob

trisperma Fig. 76A. Hague; Huddle Bay; Harris Bay bog mat

trisperma var. *billingsii* Harris Bay bog mat

vulpinoidea Fig. 71. Pilot Knob

1. Staminate and pistillate flowers in the same spike; spikes more or less uniform in shape
 2. Stigmas three; staminate scales connate at base much like a miniature aroid spathe; spike solitary, terminal*C. leptalea*
 2. Stigmas two
 3. Culms arising from axils of preceding year's leaves on prostrate culms lying in Sphagnum moss*C. chordorrhiza*
 3. Culms arising from roots or rootstocks
 4. Spikelets one*C. exilis*
 4. Spikelets two or more
 5. Perigynia with thin winged margins, sometimes narrow but at least present on the lower part of the beak and the upper part of the body of the perigynia. (Species keying to this point belong to an extremely difficult taxonomic complex—the Ovals. Precise measurements are necessary since forms of one species often simulate another species to an exasperating degree. Other books should be consulted for more than field identification.)
 6. Perigynia more than 2.5 mm wide*C. alata*
 6. Perigynia less than 2 mm wide
 7. Perigynia with wing more prominent on upper half, narrowed or absent on lower half
 8. Spikelets crowded, overlapping in a dense, compact inflorescence
 9. Inflorescence 2.5-5 cm long; spikelets tapered at base; perigynia appressed-ascending*C. tribuloides*
 9. Inflorescence 1.5-3 cm long; spikelets rounded at base; perigynia appressed or spreading
 10. Perigynia appressed, usually winged to the base though wing narrowed below; pistillate scales acute and sharp. (Hybrids between this species and the next have been postulated)*C. bebbii*
 10. Perigynia spreading or recurved, wing usually absent toward the base; pistillate scales acute with a blunt or notched tip*C. cristatella*
 8. Spikelets remote, separated in a long, flexuous inflorescence*C. projecta*
 7. Perigynia winged from base to beak without conspicuous narrowing on lower half
 11. Inflorescence greenish; perigynia distinctly nerved on inner face*C. normalis*
 11. Inflorescence brownish; perigynia nerveless or at most slightly nerved at base of inner face*C. bebbii*
 5. Perigynia without winged margins (at most with a thin rib)
 12. Inflorescence simple (any branch with only one spikelet); spikelets 10 or less
 13. Achene nearly filling body of perigynium; perigynia elliptic, with rounded margins, surface greenish-white dotted under magnification, beak short
 14. Lowest spikelet subtended by a bract several times as long as the spikelet, spikelets 1-5 flowered, widely separated in a flexuous, filiform inflorescence*C. trisperma*
 14. Lowest spikelet subtended by a bract usually less than twice as long as the spikelet, spikelets 3-30 flowered in a straightish, firm inflorescence
 15. Inflorescence elongate; each spikelet with 10-30 perigynia*C. canescens*
 15. Inflorescence subglobose with 2-4 closely spaced silvery spikelets; each spikelet with 3-10 perigynia*C. tenuiflora*
13. Achene filling only upper portion of perigynium (spongy below the achene); perigynia broadest toward the base, margins ribbed or sharp, surface not greenish-white dotted under magnification, beak prominent. (Species keying to this point belong to another difficult group—the Stellulatae. Confident identification may require additional reference books or minute comparisons with correctly identified specimens.)
16. Pistillate scales bluntish, shorter than body of perigynium (excluding beak); beak about ¼ total length of perigynium

- 17. Leaves lax, delicate, less than 1 mm wide; perigynia with veins on inner surface*C. howei*
- 17. Leaves stiff, ascending, 1.2-2 mm wide; perigynia without veins on inner surface*C. interior*
- 16. Pistillate scales acutish, as long or nearly as long as body of perigynium (excluding beak);
beak about $\frac{1}{3}$ total length of perigynium*C. muricata*
- 12. Inflorescence compound (branches, at least the lowest, with two or more spikelets);
spikelets numerous
- 18. Perigynia 4 mm or more long; culms spongy, leaf sheaths strongly cross puckered*C. stipata*
- 18. Perigynia 3 mm or less long; culms not spongy
- 19. Perigynia flat*C. vulpinoidea*
- 19. Perigynia plump
- 20. Sheaths copper-colored; inflorescence loose; perigynia appressed and concealed by
their scales; perigynia flattish on ventral face*C. prairea*
- 20. Sheaths pale, not copper-colored; inflorescence compact; perigynia spreading, not
concealed by their scales; perigynia convex on ventral face*C. diandra*
- 1. Staminate and pistillate flowers in different spikes or the staminate flowers in a strongly con-
stricted terminal portion of a spike
- 21. Perigynia with beak 2-toothed, each tooth longer than wide
- 22. Perigynia 15 or less per spike; pistillate spikes globose or nearly so*C. intumescens*
- 22. Perigynia 15 or more per spike; pistillate spikes cylindric or short oblong
- 23. Perigynia densely pubescent
- 24. Leaves flat, 1.5-5 mm wide; stems sharply 3-angled*C. lanuginosa*
- 24. Leaves rolled, 2 mm or less wide; stems with 3 rounded angles*C. lasiocarpa*
- 23. Perigynia glabrous
- 25. Perigynia nearly all pointing downward
- 26. Pistillate spikes upright, sessile or with short peduncles*C. flava*
- 26. Pistillate spikes drooping on long slender peduncles
- 27. Teeth of mature perigynium 1.5-2 mm long, widely spreading*C. comosa*
- 27. Teeth of mature perigynium 0.5-1 mm long, parallel or slightly spreading
.....*C. pseudocyperus*
- 25. Perigynia nearly all pointing upward (except sometimes the lowest)
- 28. Pistillate scales terminated with an awn
- 29. Staminate spikes 2 or more*C. lacustris*
- 29. Staminate spikes solitary
- 30. Perigynia with 8-10 veins*C. lurida*
- 30. Perigynia with 15-20 veins*C. hystericina*
- 28. Pistillate scales without an awn
- 31. Perigynia 4-8 mm long; staminate spikes 2 or more*C. rostrata*
- 31. Perigynia 12-15 mm long; staminate spike solitary*C. lupulina*
- 21. Perigynia with beak not 2-toothed, at most slightly notched at tip
- 32. Pistillate spikes drooping
- 33. Pistillate scales terminated with a long serrulate awn
- 34. Leaf sheaths smooth; pistillate scales notched at base of awn*C. crinata*
- 34. Leaf sheaths scabrous; pistillate scales tapered to base of awn*C. gynandra*
- 33. Pistillate scales without an awn
- 35. Roots glabrous; lower sheaths with threadlike brown fibers opposite the leaf blade
.....*C. stricta*
- 35. Roots pubescent
- 36. Pistillate scales nearly as broad as the perigynium*C. limosa*
- 36. Pistillate scales conspicuously narrower than the perigynium*C. magellanica*
- 32. Pistillate spikes erect
- 37. Perigynia scabrous, beak prominent, obscurely toothed; plants forming extensive beds
in wet woods*C. scabrata*
- 37. Perigynia granular-papillate or smooth, beak minute, not toothed; plants often forming
large dense hummocks*C. stricta*



Fig. 60. *Carex exilis*; Fig. 61. *C. howei*; Fig. 62. *C. interior*; Fig. 63. *C. muricata*; Fig. 64. *C. alata*; Fig. 65. *C. bebbii*; Fig. 66. *C. cristatella*; Fig. 67. *C. normalis*; Fig. 68. *C. projecta*; Fig. 69. *C. tribuloides*.



Fig. 70. *Carex stipata*; Fig. 71. *C. vulpinoidea*; Fig. 72. *C. diandra*; Fig. 73. *C. prairea*; Fig. 74. *C. chordorrhiza*; Fig. 75. *C. canescens*; Fig. 76. *C. tenuiflora*; Fig. 76A. *C. trisperma*; Fig. 77. *C. leptalea*.



Fig. 78. *Carex comosa*; Fig. 79. *C. pseudocyperus*; Fig. 80. *C. lurida*; Fig. 81. *C. hystericina*; Fig. 82. *C. magellanica*; Fig. 83. *C. limosa*; Fig. 84. *C. gynandra*; Fig. 85. *C. crinata*.



Fig. 86. *Carex lacustris*; Fig. 87. *C. stricta*; Fig. 88. *C. lanuginosa*; Fig. 89. *C. lasiocarpa*; Fig. 90. *C. intumescens*; Fig. 91. *C. lupulina*; Fig. 92. *C. flava*; Fig. 93. *C. rostrata*; Fig. 94. *C. scabrata*.



Fig. 95. *Cyperus strigosus*; Fig. 96. *C. rivularis*; Fig. 97. *Eriophorum gracile*; Fig. 98. *E. vaginatum*; Fig. 99. *E. virginicum*; Fig. 100. *Dulichium arundinaceum*; Fig. 101. *Eleocharis acicularis*; Fig. 102. *E. smallii*; Fig. 103. *Rhynchospora alba*.



Fig. 104. *Scirpus subterminalis*; Fig. 105. *S. pungens*; Fig. 106. *S. atrovirens*; Fig. 107. *S. rubrotinctus*; Fig. 108. *S. acutus*; Fig. 109. *S. validus*; Fig. 110. *S. pedicellatus*; Fig. 111. *S. cyperinus*; Fig. 112. *S. pendulus*.

CYPERUS GALINGALE

aristatus (*C. inflexus*) Hague; Caldwell

diandrus Harris Bay

rivularis Fig. 96. Harris Bay; Caldwell

strigosus Fig. 95. Bolton Ldg

1. Spikelets pinnately placed *C. strigosus*

1. Spikelets radiating

2. Scales with 7-13 veins *C. aristatus*

2. Scales with 3-5 veins

3. Pigmentation mostly at summit of scale *C. diandrus*

3. Pigmentation mostly at base of scale *C. rivularis*

DULICHIMUM

arundinaceum THREE-WAY SEDGE Fig. 100. Northwest Bay;

East Lake George marsh; Warner Bay; Dunham Bay

ELEOCHARIS SPIKE RUSH

acicularis Fig. 101.

erythropoda (*E. calva*)

smallii (*E. palustris*) Fig. 102.

1. Styles 3-cleft; achene 3-angled *E. acicularis*

1. Styles 2-cleft; achene 2-angled

2. Spikelets with blunt scales, with one empty basal scale *E. erythropoda*

2. Spikelets with sharp pointed scales, with 2 or 3 empty basal scales *E. smallii*

ERIOPHORUM COTTON GRASS

alpinum (*Scirpus hudsonianus*) East Lake George marsh at Brayton

gracile Fig. 97. Harris Bay

vaginatum ssp. *spissum* (*E. callitrix*) Fig. 98. East Lake George marsh; Harris Bay bog mat

virginicum Fig. 99. South of Brayton; Harris Bay bog mat

1. Spikelets grouped into a single cluster

2. Stem about 0.5 mm in diameter; foliaceous bract 1, ovate; each floret with 6 bristles

..... *E. alpinum*

2. Stem about 1 mm in diameter; foliaceous bract absent; each floret with many bristles .. *E. vaginatum*

1. Spikelets grouped into 2 or more clusters

3. Leaves 1-2 mm wide, channeled; cluster of spikelets in a loose umbel; foliaceous bract 1,

shorter than the umbel *E. gracile*

3. Leaves 2-4 mm wide, flat; cluster of spikelets in a compact umbel; foliaceous bracts 2 or 3;

exceeding the umbel *E. virginicum*

RHYNCHOSPORA BEAK RUSH

alba Fig. 103. Bolton Ldg; East Lake George

SCIRPUS BULRUSH, WOOLGRASS

acutus HARDSTEM BULRUSH Fig. 108. N end of Lake; Prison I.; Harris Bay

atrocinetus Cotton Pt; Brayton

atrovirens Fig. 106. Lake outlet; Pilot Knob; Harris Bay; Dunham Bay

cyperinus var. *peliacus* Fig. 111. Lake outlet; Black Pt; Northwest Bay; Bolton Ldg; Harris Bay

pedicellatus Fig. 110. Cotton Pt. Brayton

pendulus (*S. lineatus*) Fig. 112. Brayton; Harris Bay

pungens (*S. americanus*) THREE-SQUARE Fig. 105. Hearts Bay; Harris Bay

rubrotinctus (*S. microcarpus*) Fig. 107. Pilot Knob; Million Dollar Beach marsh

subterminalis Fig. 104. Northwest Bay; Dunham Bay

validus SOFTSTEM BULRUSH Fig. 109. Lake outlet; Dunham Bay; pond at S end of Lake

1. Involucral leaves one

2. Spikelets solitary on each stem; stems weak; often with tufts of hairlike leaves *S. subterminalis*

2. Spikelets several; stems rigid

3. Stems terete

- 4. Stems firm; scales of spikelet longer than achene; achenes 2.5-3 mm long *S. acutus*
- 4. Stems soft; scales about as long as achene; achenes about 2 mm long *S. validus*
- 3. Stems triangular *S. pugens*
- 1. Involucral leaves 2 or more
- 5. Stems solitary from a thick rootstock
- 6. Basal sheaths green; inflorescence once or twice branched; scales of spikelet mucronate; bristles barbed, about as long as achene or absent; achenes 3-angled *S. atrovirens*
- 6. Basal sheaths reddish; inflorescence repeatedly branched; scales acute or obtuse or mucronulate; bristles longer than achene, achenes 2-angled *S. rubrotinctus*
- 5. Stems in clumps; bristles without barbs
- 7. Mature bristles little longer than the scales *S. pendulus*
- 7. Mature bristles much longer than the scales giving the inflorescence a wooly appearance
- 8. Spikelets mostly sessile in glomerules of 3-15 *S. cyperinus*
- 8. Lateral spikelets mostly stalked
- 9. Involucels (bracts subtending each spikelet) blackish *S. atrocinctus*
- 9. Involucels red-brown or yellow-brown *S. pedicellatus*

ARACEAE

CALLA

palustris WATER ARUM, WILD CALLA Fig. 113.

PELTANDRA

virginica ARROW ARUM Fig. 114.

SYMPLOCARPUS

foetidus (*Spathyema f.*) SKUNK CABBAGE Fig. 115. Red Rock Bay; Brayton marsh; Dunham Bay

LEMNACEAE

LEMMA DUCKWEED

minor Fig. 119.

trisulca Fig. 121. Lake outlet; Red Rock Bay; Bolton Ldg; Pilot Knob; Warner Bay; Dunham Bay

- 1. Fronds 2-4 mm long, not stalked, free and floating on the surface *L. minor*
- 1. Fronds 6-12 mm long, stalked, mostly attached to the parent plant and sinking below the water surface *L. trisulca*

SPIRODELA

polyrhiza LARGE DUCKWEED Fig. 120.

ERIOCAULACEAE

ERIOCAULON

septangulare PIPEWORT Fig. 118.

PONTEDERIACEAE

HETERANTHERA

dubia (*Zosterella d.*) WATER STAR GRASS Fig. 117.

PONTEDERIA

cordata PICKERELWEED Fig. 116. *P. c.* forma *taenia* seen at Northwest Bay and Harris Bay



Fig. 113. *Calla palustris*; Fig. 114. *Peltandra virginica*; Fig. 115. *Symplocarpus foetidus*; Fig. 116. *Pontederia cordata*; Fig. 117. *Heteranthera dubia*; Fig. 118. *Eriocaulon septangulare*; Fig. 119. *Lemna minor*; Fig. 120. *Spirodela polyrrhiza*; Fig. 121. *Lemna trisulca*.



Fig. 122. *Juncus effusus*; Fig. 123. *J. canadensis*; Fig. 124. *J. brevicaudatus*; Fig. 125. *J. acuminatus*; Fig. 126. *J. marginatus*; Fig. 127. *J. articulatus*; Fig. 128. *J. pelocarpus*; Fig. 129. *J. nodosus*; Fig. 130. *Iris versicolor*.

JUNCACEAE

JUNCUS RUSH

acuminatus (*J. paradoxus*) Fig. 125. Bolton Ldg; S end of Lake

articulatus Fig. 127. Caldwell

brevicaudatus Fig. 124. Sabbath Day Pt; Harris Bay; Lake George village

canadensis Fig. 123. Harris Bay; Dunham Bay

effusus var. *solutus* Fig. 122.

maginatus Fig. 126. Northwest Bay; Bolton; Brayton

nodosus Fig. 129. Bolton Ldg

pelocarpus Fig. 128.

1. Inflorescence appearing lateral *J. effusus*
1. Inflorescence terminal
 2. Leaves nodose, having firm cross partitions at regular intervals
 3. Stamens 3
 4. Seeds with tails (whitish tubular extensions of the seed coat)
 5. Seeds, including tails, 1-1.8 mm long; tails $\frac{2}{3}$ as long as the body of the seed; flowers 5-50 in each cluster; inflorescence (when well developed) quite broad; flower clusters usually subglobose *J. canadensis*
 5. Seeds, including tails, about 1 mm long; tails about one half the body of the seed; flowers 3-7 in each cluster; inflorescence narrow and elongate; flower clusters hemispherical *J. brevicaudatus*
 4. Seeds without tails *J. acuminatus*
3. Stamens 6
 6. Flowers borne singly or in pairs or partly replaced by bulblets *J. pelocarpus*
 6. Flowers more than 3 in a cluster
 7. Clusters spherical, with 10-25 flowers *J. nodosus*
 7. Clusters hemispherical, with 3-11 flowers *J. articulatus*
2. Leaves not nodose
 8. Flowers borne singly or in pairs or partly replaced by bulblets *J. pelocarpus*
 8. Flowers in clusters *J. marginatus*

IRIDACEAE

IRIS IRIS

pseudacorus YELLOW FLAG Turtle I.; Warner Bay; Dunham Bay

versicolor BLUE FLAG Fig. 130.

1. Flowers blue *I. versicolor*
1. Flowers yellow *I. pseudacorus*

POLYGONACEAE

POLYGONUM SMARTWEED

amphibium var. *emersum* (*P. coccinium*, *P. inundatum*) Fig. 132. Black Pt; Dunham Bay; S end of Lake

amphibium var. *stipulaceum* (*P. natans*, *P. fluitans*, *P. hartwrightii*) Hague; Big Burnt I.

hydropiper WATER PEPPER Fig. 134. Pilot Knob

pensylvanicum var. *laevigatum* Pilot Knob; Warner Bay

punctatum var. *confertiflorum* Fig. 133. Brayton; Dunham Bay; Million Dollar Beach

1. Plants annual, from a taproot
2. Flowers with yellow to brownish punctations (glands)
 3. Achene surface dull; flowers with a pinkish tinge *P. hydropiper*

3. Achene surface shiny; flowers without pink tinge *P. punctatum*
2. Flowers not punctate *P. pensylvanicum*
1. Plants perennial with rhizomes or stolons
4. Flowers greenish to cream with glandular dots *P. punctatum*
4. Flowers pink to carmine, without glands
5. Inflorescence 3 cm or less in length *P. amphibium* var. *stipulaceum*
5. Inflorescence 3 cm or more in length *P. amphibium* var. *emersum*

RUMEX

orbiculatus (*R. britannica*) WATER DOCK Fig. 131.

Northwest Bay; Pilot Knob; Harris Bay; Dunham Bay; swamp at Brayton

verticillatus SWAMP DOCK Black Pt; Sabbath Day Pt; south of abandoned road from Cleverdale to Brayton

1. Leaves often slightly reddish, margins crinkled or denticulate; peduncles about as long as mature sepals, with no obvious joint; mature sepals nearly orbicular, 5-8 mm long; achenes about ½ as long as sepals *R. orbiculatus*
1. Leaves not reddish, margins not crinkled nor denticulate; peduncles 3 to 4 times as long as mature sepals, with a swollen joint less than a mm from the base; mature sepals 3.5-5 mm long; triangular-ovate; achenes about ⅔ as long as sepals *R. verticillatus*

NYMPHAEACEAE

BRASENIA

schreberi WATER-SHIELD Fig. 137. Lake outlet; Northwest Bay;

Warner Bay; Harris Bay; Dunham Bay

NUPHAR YELLOW WATER LILY

luteum subsp. *macrophyllum* (*N. advena*, *Nymphaeozanthus a.*) Dunham Bay

luteum subsp. *pumilum* (*N. microphyllum*, *Ny. m.*) Echo Bay by Rogers Rock; Shelving Rock; Bolton Ldg; Cooper Pt; Dunham Bay

luteum subsp. *variegatum* (*Ny. v.*) Fig. 135.

NYMPHAEA WHITE WATER LILY

odorata (*Castalia o.*) Fig. 136.

CERATOPHYLLACEAE

CERATOPHYLLUM

demersum COONTAIL Fig. 139.

echinatum Fig. 140. Deep water of Warner Bay

1. Leaf lobes mostly toothed on only one side; fruits with no lateral spines, only 2 basal spines *C. demersum*
1. Leaf lobes entire or nearly so; fruits with many lateral spines *C. echinatum*

RANUNCULACEAE

CALTHA

palustris MARSH MARIGOLD Fig. 138. Pilot Knob; Dunham Bay

RANUNCULUS BUTTERCUP

flabellaris Fig. 142. Swamp near Brayton; Harris Bay swamp; Dunham Bay

longirostris (*R. circinatus*) Fig. 143.

reptans (*R. flammula*) Fig. 145.

septentrionalis Fig. 144. Marsh along shore, Pilot Knob

1. Leaves linear or linear-lanceolate, not lobed; flowers yellow *R. reptans*



Fig. 131. *Rumex orbiculatus*; Fig. 132. *Polygonum amphibium*; Fig. 133. *P. punctatum*; Fig. 134. *P. hydropiper*; Fig. 135. *Nuphar lutem*; Fig. 136. *Nymphaea odorata*; Fig. 137. *Brasenia schreberi*.



Fig. 138. *Caltha palustris*; Fig. 139. *Ceratophyllum demersum*; Fig. 140. *C. echinatum*; Fig. 141. *Rorippa palustris*; Fig. 142. *Ranunculus flabellaris*; Fig. 143. *R. longistrostris*; Fig. 144. *R. septentrionalis*; Fig. 145. *R. reptans*; Fig. 146. *Subularia aquatica*; Fig. 147. *Sarracenia purpurea*; Fig. 148. *Drosera rotundifolia*.

1. Leaves broad, lobed or finely dissected
 2. Stems flaccid and requiring water for support; submersed leaves dissected 2 or 3 times into slender segments
 3. Flowers yellow; emersed leaves sometimes present *R. flabellaris*
 3. Flowers white; emersed leaves absent *R. longirostris*
 2. Stems stiff and erect; leaves lobed but all lobes broad *R. septentrionalis*

CRUCIFERAE

CARDAMINE BITTER CRESS

- pensylvanica* Log Bay I.
pratensis CUCKOO FLOWER Bolton Ldg
pratensis subsp. *palustris* Pilot Knob; Cotton Pt; Harris Bay
1. Cauline leaves with terminal leaflet usually wider than the other leaflets; petals white, 1.5-4 mm long *C. pensylvanica*
 1. Cauline leaves with terminal leaflet usually as wide or narrower than the other leaflets; petals; petals white or pink, 10-15 mm long *C. pratensis*

RORIPPA

- palustris* (*R. islandica*, *Radicula p.*) YELLOW CRESS Fig. 141. Swamp near Brayton

SUBULARIA

- aquatica* subsp. *americana* AWLWORT Fig. 146.

SARRACENIACEAE

SARRACENIA

- purpurea* PITCHER PLANT Fig. 147. Silver Bay; bog mat southwest of Brayton; Harris Bay bog mat

DROSERACEAE

DROSERA SUNDEW

- rotundifolia* Fig. 148.

SAXIFRAGACEAE

CHRYOSPLENIUM

- americanum* GOLDEN SAXIFRAGE Fig. 150. Swamp near Brayton; Dunham Bay; Shelving Rock

PENTHORUM

- sedoides* DITCH STONECROP Fig. 149. Bolton Ldg; Pilot Knob; Dunham Bay

ROSACEAE

POTENTILLA

- palustris* MARSH CINQUEFOIL Fig. 151.

CALLITRICHACEAE

CALLITRICHE WATER STARWORT

- verna* (*C. palustris*) Fig. 152. Lake outlet; Paradise Bay; Northwest Bay; Dunham Bay



Fig. 149. *Penthorum sedoides*; Fig. 150. *Chrysosplenium americanum*; Fig. 151. *Potentilla palustris*; Fig. 152. *Calitriche verna*; Fig. 153. *Hypericum boreale*; Fig. 154. *H. punctatum*; Fig. 155. *Triadenum fraseri*.

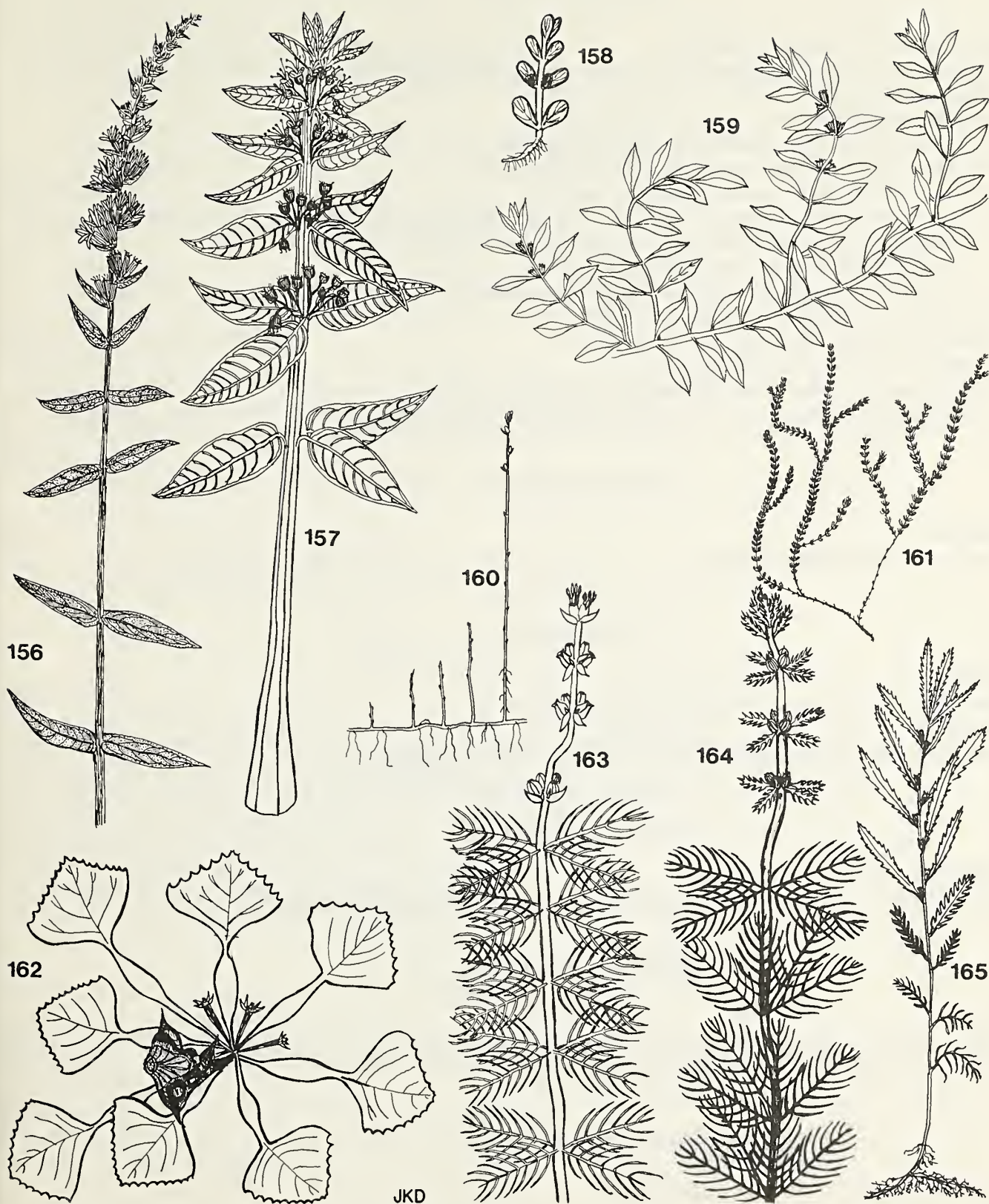


Fig. 156. *Lythrum salicaria*; Fig. 157. *Decodon verticillatus*; Fig. 158. *Elatine minima*; Fig. 159. *Ludwigia palustris*; Fig. 160. *Myriophyllum tenellum*; Fig. 161. *M. alterniflorum*; Fig. 162. *Trapa natans*; Fig. 163. *Myriophyllum spicatum*; Fig. 164. *M. verticillatum*; Fig. 165. *Proserpinaca palustris*.

HYPERICACEAE

HYPERICUM ST. JOHN'S-WORT

boreale Fig. 153. Northwest Bay; Kattskill Bay; Harris Bay; Dunham Bay

ellipticum Harris Bay

mutilum Hermit I.; Speaker Heck I.; Dunham Bay

punctatum Fig. 154. Pilot Knob; Brayton; Dunham Bay

1. Stems and often the flowers with black dots; fruit 3-celled *H. punctatum*
1. Stems and flowers without black dots; fruit 1-celled
 2. Leaves with veins originating at intervals along the midrib; stamens many *H. ellipticum*
 2. Leaves with veins originating at the base of the blade; stamens 12 or less
 3. Bracts of inflorescence resembling stem leaves *H. boreale*
 3. Bracts of inflorescence much smaller than stem leaves *H. mutilum*

TRIADENUM MARSH ST. JOHN'S-WORT

fraseri (*Hypericum virginicum* var. *f.*) Fig. 155.

virginicum (*Hypericum v.*) Dunham Bay

1. Sepals ovate-lanceolate, acute, 5-7 mm long; style 2-3 mm long *T. fraseri*
1. Sepals oblong or elliptic, obtuse, 2.5-5 mm long; style 0.5-1.3 mm long *T. virginicum*

ELATINACEAE

ELATINE

minima WATERWORT Fig. 158.

LYTHRACEAE

DECODON

verticillatus var. *laevigatus* WATER WILLOW Fig. 157.

LYTHRUM

salicaria PURPLE LOOSESTRIFE Fig. 156. Warner Bay; Harris Bay

ONAGRACEAE

LUDWIGIA

palustris var. *americana* WATER PURSLANE Fig. 159. Northwest Bay; Pilot Knob

HYDROCARYACEAE

TRAPA

natans WATER CHESTNUT Fig. 162. Dunham Bay (a few specimens seen and destroyed by State personnel; none found during past few years)

HALORAGACEAE

MYRIOPHYLLUM WATER MILFOIL

alterniflorum Fig. 161.

spicatum subsp. *exalbescens* Fig. 163. Lake outlet; Warner Bay; Harris Bay; Dunham Bay

tenellum Fig. 160.

verticillatum Fig. 164. Lake outlet; Dunham Bay

1. Leaves not dissected, scales minute or absent *M. tenellum*
1. Leaves pinnately dissected
 2. Submersed leaves 3-10(-12) mm long; flowers alternate *M. alterniflorum*
 2. Submersed leaves 10-50 mm long; flowers whorled
 3. Bracts shorter than the flowers and fruits; not lobed; stems often whitish on drying
..... *M. spicatum*
 3. Bracts mostly longer than the flowers, deeply lobed; stems remaining greenish or brownish
..... *M. verticillatum*

PROSERPINACA

palustris var. *creba* MERMAID WEED Fig. 165. Brayton

UMBELLIFERAE

CICUTA WATER HEMLOCK

bulbifera Fig. 166.

maculata Fig. 167; Turtle I.; Big Burnt I.; Log Bay I.; Pilot Knob; Harris Bay; Dunham Bay

1. Leaflets linear, 1-5 mm wide; leaves usually with bulblets in the axils *C. bulbifera*
1. Leaflets lanceolate to ovate-oblong, 5-20 mm wide; leaves without bulblets *C. maculata*

HYDROCOTYLE

americana WATER PENNYWORT Fig. 169. Northwest Bay; Shelving Rock; Pilot Knob; Dunham Bay

SIUM

suave WATER PARSNIP Fig. 168. Lake outlet; N end of Lake; Red Rock Bay; Northwest Bay; Uncas I.; Warner Bay; Harris Bay

PRIMULACEAE

LYSIMACHIA

nummularia MONEYWORT Fig. 170. Smith Bay; Paradise Bay; Big Burnt I.

terrestris SWAMP CANDLE Fig. 172. Little Harbor I.; Oval I.; Log Bay I.; Pilot Knob; Speaker Heck I.; Lake George village; Harris Bay

thyrsiflora (*Naumburgia t.*) TUFTED LOOSESTRIFE Fig. 173. Lake outlet; Sabbath Day Pt.; Northwest Bay; Bolton Ldg; Brayton

1. Stems creeping; flowers solitary in the axils *L. nummularia*
1. Stems erect; flowers in racemes
 2. Racemes terminal; petioles without fringe of hairs *L. terrestris*
 2. Racemes axillary; petioles with fringe of hairs *L. thyrsiflora*

GENTIANACEAE

MENYANTHES

trifoliata var. *minor* BUCKBEAN Fig. 171. Northwest Bay swamp; Harris Bay swamp; Dunham Bay marsh

NYMPHOIDES

cordatum (*Trachysperma lacunosa*) FLOATING-HEART Fig. 176. Harris Bay (reported by House in 1941, no voucher)

ASCLEPIADACEAE

ASCLEPIAS

incarnata SWAMP MILKWEED Fig. 174.



Fig. 166. *Cicuta bulbifera*; Fig. 167. *C. maculata*; Fig. 168. *Sium suave*; Fig. 169. *Hydrocotyle americana*; Fig. 170. *Lysimachia nummularia*; Fig. 171. *Menyanthes trifoliata*; Fig. 172. *Lysimachia terrestris*; Fig. 173. *L. thyrsiflora*; Fig. 174. *Asclepias incarnata*; Fig. 175. *Myosotis scorpioides*; Fig. 176. *Nymphoides cordatum*.



Fig. 177. *Lycopus uniflorus*; Fig. 178. *Mentha arvensis*; Fig. 179. *Mimulus ringens*; Fig. 180. *Scutellaria galericulata*; Fig. 181. *S. lateriflora*; Fig. 182. *Solanum dulcamara*; Fig. 183. *Chelone glabra*; Fig. 184. *Gratiola neglecta*; Fig. 185. *Lindernia dubia*; Fig. 186. *Veronica scutellata*.

BORAGINACEAE

MYOSOTIS

scorpioides FORGET-ME-NOT, SCORPION GRASS Fig. 175.

LABIATAE

LYCOPUS

americanus WATER HOREHOUND Northwest Bay; Bass I.; Uncas I.; Hermit I.; Clark I.; Little Harbor I.; Perch I.; Pilot Knob; Speaker Heck I.

uniflorus BUGLEWEED Fig. 177. Northwest Bay; Bass I.; Gull Rock I.; Hermit I.; Crow I.; Sarah I.; Speaker Heck I.; Brayton; Harris Bay; Dunham Bay

virginicus bugleweed Perch I.; Log Bay I.; Dunham Bay

1. Leaves usually lobed; sepals with rigid spine at apex *L. americanus*
1. Leaves with coarse teeth but not lobed; sepals with apical spines
 2. Plants with tubers; fruits clusters 4-9 mm wide *L. uniflorus*
 2. Plants without tubers; fruit clusters 8-15 mm wide *L. virginicus*

MENTHA MINT

arvensis var. *canadensis* Fig. 178.

SCUTELLARIA SCULLCAP

galericulata var. *pubescens* (*S. epilobiifolia*) Fig. 180. Hague; Turtle I.; Speaker Heck I.; Harris Bay; Dunham Bay

lateriflora Fig. 181. Big Burnt I.; Uncas I.; Gull Rock I.; Sarah I.; Hermit I.; Pilot Knob; Harris Bay

1. Petioles 1-4 mm long; flowers borne singly in the leaf axils *S. galericulata*
1. Petioles 5-20 mm long; flowers in racemes in the axils *S. lateriflora*

SOLANACEAE

SOLANUM

dulcamara BITTERSWEET NIGHTSHADE Fig. 182.

SCROPHULARIACEAE

CHELONE

glabra TURTLEHEAD Fig. 183. Northwest Bay; Montcalm Pt.; Brayton; Dunham Bay

GRATIOLA

neglecta (*G. virginiana*) HEDGE HYSSOP Fig. 184. Green Island; Bolton Ldg; Harris Bay

LINDERNIA

dubia subsp. *major* (*Ilysanthes d.*) FALSE PIMPERNEL Fig. 185. Harris Bay

MIMULUS

ringens MONKEY FLOWER Fig. 179. Dunham Bay

VERONICA

scutellata MARSH SPEEDWELL Fig. 186. Uncas I.; Speaker Heck I.; Brayton; Dunham Bay; Bloody Pond

LENTIBULARIACEAE

UTRICULARIA BLADDERWORT

intermedia Fig. 189. Northwest Bay; Bolton Ldg; Harris Bay; Dunham Bay



JKD

Fig. 187. *Utricularia resupinata*; Fig. 188. *U. minor*; Fig. 189. *U. intermedia*; Fig. 190. *U. vulgaris*; Fig. 191. *Campanula aparinoides*; Fig. 192. *Galium palustre*; Fig. 193. *G. trifidum*; Fig. 194. *Lobelia cardinalis*; Fig. 195. *L. dortmanna*.



Fig. 196. *Aster puniceus*; Fig. 197. *A. lateriflorus*; Fig. 198. *Solidago graminifolia*; Fig. 199. *Eupatorium maculatum*; Fig. 200. *E. perfoliatum*; Fig. 201. *Bidens frondosa*; Fig. 202. *B. beckii*.

minor Fig. 188. Lake outlet; Harris Bay; Dunham Bay

resupinata Fig. 187.

vulgaris subsp. *americana* (*U. macrorhiza*) Fig. 190.

1. Stems erect from a rooted base; bladders absent or poorly developed *U. resupinata*
1. Stems floating in the water, sometimes rooted; bladders commonly found in finely dissected leaves
 2. Stems 0.5 or more mm thick; leaf segments terete, without a midrib; plants free floating *U. vulgaris*
 2. Stems less than 0.5 mm thick; leaf segments flattened, with a midrib; plants creeping on the bottom in shallow water
 3. Bladders on stem separate from leaves; margins of terminal leaf segments minutely spiny; corolla spur nearly as long as lower lip *U. intermedia*
 3. Bladders on leaves; margins of leaf segments entire; corolla spur short *U. minor*

RUBIACEAE

GALIUM BEDSTRAW

palustre Fig. 192. Lake outlet; Perch I.; Pilot Knob; Speaker Heck I.; Lake George village

trifidum subsp. *tinctorium* Fig. 193. Northwest Bay; Bolton Ldg; Bloody Pond

1. Flowers in much-branched clusters *G. palustre*
1. Flowers mostly in groups of three *G. trifidum*

CAMPANULACEAE

CAMPANULA MARSH BELLFLOWER

aparinooides Fig. 191. Northwest Bay; Harris Bay; Dunham Bay

LOBELIA

cardinalis CARDINAL FLOWER Fig. 194. Gull Bay; Pilot Knob; Brayton

dortmanna WATER LOBELIA Fig. 195. Juniper I.; Cooks Bay; Forest Bay; Hague; Smith Bay;

Bluff Head; Bolton Ldg; Huddle Bay; Dome I.; Phelps I.; Gem I.

siphilitica BLUE LOBELIA Marsh near shore; Bolton Ldg

1. Leaves in a basal rosette, fleshy *L. dortmanna*
1. Leaves on the stem, flat
 2. Flowers red *L. cardinalis*
 2. Flowers blue *S. siphilitica*

COMPOSITAE

ASTER ASTER

junciformis (*A. junceus*) Dunham Bay

lateriflorus CALICO ASTER Fig. 197. Northwest Bay; Little Harbor I.; Uncas I.; Oahu I.;

Crow I.; Sarah I.; Bolton Ldg; Dunham Bay

puniceus PURPLE-STEM ASTER Fig. 196. Pilot Knob; Brayton

simplex (*A. paniculatus*) Bolton Ldg; Brayton; Harris Bay

1. Stem leaves clasping *A. puniceus*
1. Stem leaves not clasping
 2. Bracts of the involucre nearly equal in length; leaves more than 15 times as long as wide *A. junciformis*
 2. Bracts unequal in length; leaves seldom more than 12 times as long as wide
 3. Leaves pubescent beneath, at least along the midrib; lobes of the disk corollas $\frac{1}{2}$ to $\frac{3}{4}$ as long as the tube; flower heads mostly on one side of the branch *A. lateriflorus*

3. Leaves glabrous; lobes of the disk corollas 1/5 to 1/2 as long as the tube; flower heads on all sides of the branch *A. simplex*

BIDENS BEGGAR TICKS, BUR MARIGOLD

beckii (*Megalodonta b.*) WATER MARIGOLD Fig. 202.

comosa (*B. tripartita*) Northwest Bay; Brayton; Harris Bay

frondosa Fig. 201. Northwest Bay; Mohican I.; Pilot Knob; Brayton; Harris Bay; Dunham Bay

vulgata Bolton Ldg

1. Aquatic plants with filiform-dissected submersed leaves; achenes terete *B. beckii*
1. Subaquatic plants without filiform-dissected leaves; achenes flattened or quadrangular
 2. Leaves simple, unlobed to 3-lobed, terminal lobe without an evident stalk *B. comosa*
 2. Leaves compound, terminal leaflet with an evident petiolelike stalk
 3. Disk flowers orange; outer elongated bracts 5-10, sparingly ciliate *B. frondosa*
 3. Disk flowers yellow; outer bracts 10-20, copiously hispid *B. vulgata*

EUPATORIUM

fistulosum (*E. maculatum*, in part) JOE-PYE-WEED Bolton Ldg; Pilot Knob

maculatum (*E. bruneri*) JOE-PYE-WEED Fig. 199. Bolton Ldg; Brayton

perfoliatum BONESET Fig. 200. Pilot Knob; Dunham Bay

1. Leaves opposite, connate-perfoliate; flowers whitish *E. perfoliatum*
1. Leaves whorled; flowers purplish
 2. Inflorescence flat-topped; stem not glaucous; florets 8-20 *E. maculatum*
 2. Inflorescence convex; stem glaucous *E. fistulosum*

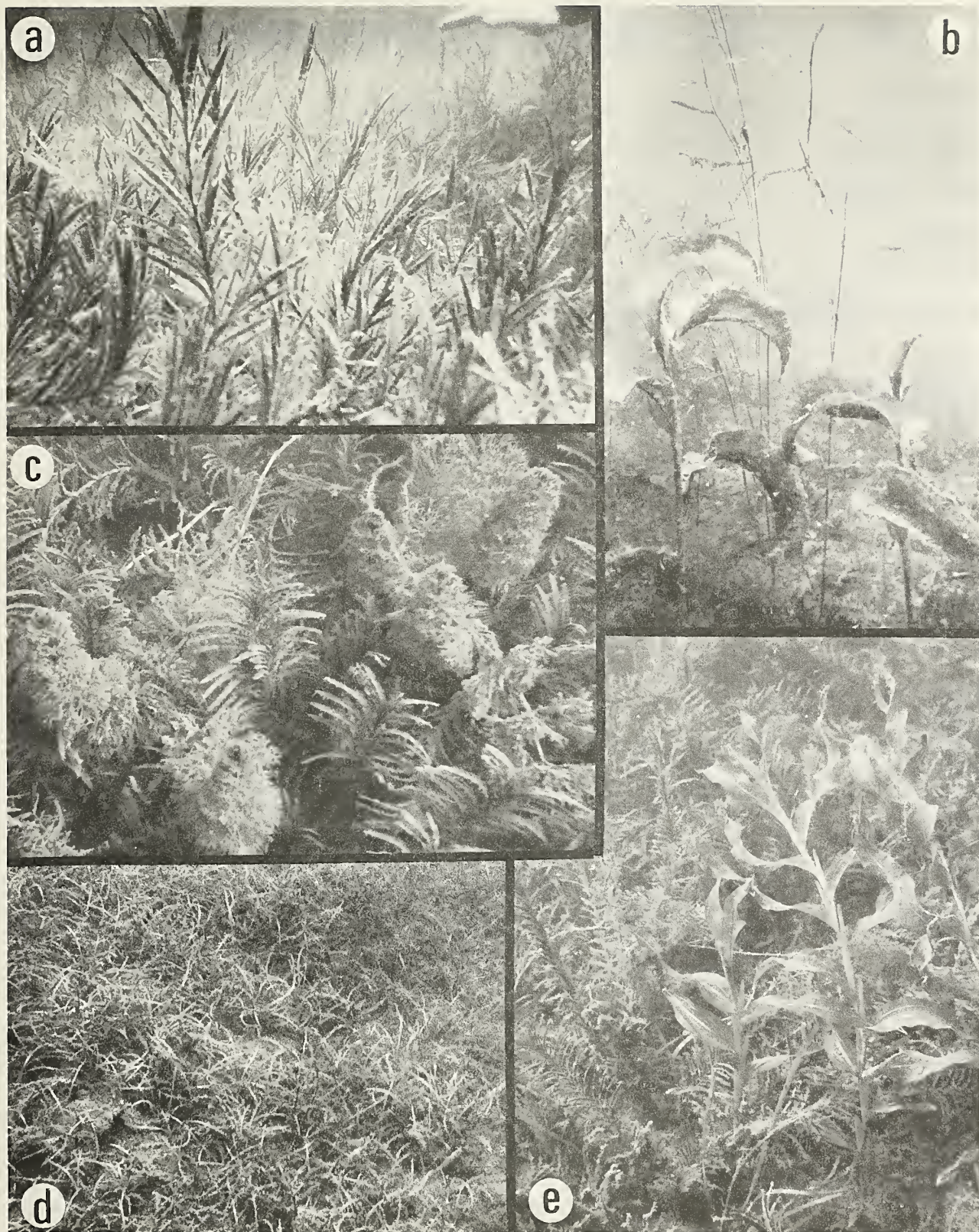
SOLIDAGO

graminifolia FLAT-TOPPED GOLDENROD Fig. 198. Big Burnt I.; Crow I.; Pilot Knob; Brayton; S end of Lake

DEPTH DISTRIBUTION DATA

Detailed underwater surveys were made to record the occurrence of species growing at water depths ranging from 1 to 12 meters. Underwater observations were made during the summers of 1973 and 1974 at 44 different sites in the lake. The location of these sites are shown on the map on page 2. The occurrence of species is given in tabular form starting at the most northerly site and moving south. The depths routinely observed were 1, 2, 3, 5, 7, and 9 meters. In this presentation, only presence or absence of a given species is scored; no information is given as to its abundance. Thirty-one species were observed most frequently in the lake and their presence is recorded in the following tables. This does not represent the total number of species growing in water at greater depths than 1 meter. Submergent macrophytes sighted infrequently are not listed in the survey. Presence of a species is scored for each depth listed above. If the notation is hyphenated (for example: 1-3), the plant was present inclusively between those depths (at 1, 2, and 3 meters). If the notation is given with a comma or "and" (for example: 1,3 or 1 & 3), the plant was observed at those depths only and not at a depth inbetween (absent at 2 meters). Species growing at depths less than 1 meter and emergent were not scored in the survey. These include species of the following genera: *Nuphar*, *Nymphaea*, *Sagittaria*, *Scirpus*, *Sparganium*, and *Typha*.

The procedure for surveying was as follows: all underwater observations were made by R. B. Sheldon using self-contained breathing apparatus. Routinely observations started at the 1-meter depth and a transect approximately 5 meters wide was traversed to the 12-meter depth. Observations were made directly underwater. Species of uncertain taxonomic position were taken from the water for closer examination. It is important to note that a thorough underwater survey was not possible at each site. Each survey as described above took between 20 to 30 minutes to complete. Any omission from the list, therefore, does not necessarily mean the plant was not present at a given site.



Growth habits of common submergent macrophytes found in Lake George.

a. *Potamogeton robbinsii* (7m); b. *P. amplifolius* and *P. gramineus* (3m); c. *Bidens beckii* and *P. robbinsii* (5m); d. *Isoetes macrospora* (9m); e: *P. praelongus* and *P. robbinsii* (5m).

| | East of
Howes
Ldg | Between
Black Pt &
Spencer Pt | Hearts
Bay | Weeds
Bay | West of
Juniper
Island | Cooks
Bay | North of
Anthony's
Nose |
|--|-------------------------|-------------------------------------|------------------------------------|---|------------------------------|-------------------------------|-------------------------------|
| <i>Bidens beckii</i> | 2 | 1-3 | 1&5 | | 2 | 3 | |
| <i>Elatine minima</i> | 1 | | | | | | |
| <i>Elodea canadensis</i> | 2 | 1-2 | 5&7 | | 2&7 | 1&5 | 9 |
| <i>Eriocaulon
septangulare</i> | 1 | 1 | 1-3 | 2 | 2 | 2 | 2 |
| <i>Heteranthera dubia</i> | 2 | 1 | | | | | |
| <i>Isoetes
echinospora
macrospora</i> | | 1 | 5 | 3
5-7 | 2
5-7 | 1&3
5-7 | 2
3-5 |
| <i>Juncus pelocarpus</i> | 1-2 | 1 | 1-3 | 2 | | | 3 |
| <i>Lobelia dortmanna</i> | | | | | 2 | 2 | |
| <i>Myriophyllum
alterniflorum
tenellum</i> | 1 | 1 | 1
1-2 | 2 | 2
2 | 2-3
1-2 | 3-5
1-2 |
| <i>Najas flexilis</i> | 1-2 | 1-3 | 1-7 | 1-7 | 2-3 | 2-5 | 1-5 |
| <i>Potamogeton
alpinus
amplifolius
crispus
epihydus
gramineus
illinoensis
pectinatus
perfoliatus
praelongus
pusillus
robbinsii
spirillus
zosteriformis</i> | 1-2 | 1-3
2-3 | 1-5
3
1-5
3
1-5
1-5 | 2
1-5
3&7
2-5
3-5
1-3
2-7 | 3
2-3
3
5-7 | 3-5
1-5
5
2-3
2&5 | 1-5
1-5
1-3
5 |
| <i>Ranunculus
longirostris</i> | 2 | 1-2 | 1 | | | | |
| <i>Sagittaria graminea</i> | 1-2 | 1-2 | 2 | | | | |
| <i>Subularia
aquatica</i> | | | | | | | |
| <i>Utricularia
resupinata</i> | 1 | | 1-3 | 2 | 2 | | 1-2 |
| <i>Vallisneria
americana</i> | 1-2 | 1-3 | 1-7 | 1-7 | 3 | 2 | 1-3 |

| | Forest
Bay | Blairs
Bay | Hague | Gull
Bay | Smith
Bay | Arcady
Bay | Lamb
Shanty
Bay |
|--|---------------|---------------|-------|-------------|--------------|---------------|-----------------------|
| <i>Bidens beckii</i> | | 3-5 | 3-5 | | 2-7 | 3 | |
| <i>Elatine minima</i> | | 1 | | 1 | | 1 | |
| <i>Elodea canadensis</i> | 5 | 1&5 | 1&5 | 1&3 | 1-9 | 7-9 | |
| <i>Eriocaulon
septangulare</i> | | 1 | 1 | 1 | 1 | 1 | 1 |
| <i>Heteranthera dubia</i> | | | | 1-2 | 1-3 | | |
| <i>Isoetes
echinospora
macrospora</i> | 5
7 | 2
7-8 | 5-7 | 2&5
5-6 | 1-2
7 | 3-7 | 1-3
5-7 |
| <i>Juncus pelocarpus</i> | | | 2 | | | 1 | 2 |
| <i>Lobelia dortmanna</i> | 2 | | | | | | 2 |
| <i>Myriophyllum
alterniflorum
tenellum</i> | 5
3 | 3-5
1 | 5 | 1
1-2 | 1-2
1-2 | 1-3 | 3
1 |
| <i>Najas flexilis</i> | 2-7 | 1-7 | 2-7 | 1-3,7 | 1-7 | 2-7 | 1-9 |
| <i>Potamogeton
alpinus
amplifolius
crispus
epihydus
gramineus
illinoensis
pectinatus
perfoliatus
praelongus
pusillus
robbinsii
spirillus
zosteriformis</i> | 5-6 | 2-5 | 3-7 | 3
1 | 1-6
1 | 3-5 | 3 |
| | 3-5 | 1-5 | 1-5 | 1-3 | 1-3 | 1-5 | 1-3 |
| | | | | | | 1-2 | |
| | 5 | 2-5 | 1-5 | 1-2 | 2-5 | 3-5 | 2-5 |
| | | 5 | | 5 | 3-5 | 5 | |
| | 5-7 | 2-7 | 3 | 1-2 | 1-7 | 3-5 | 1-9 |
| | 7-9 | 2-7 | 3-7 | 1-7 | 2-8 | 3-7 | 3-9 |
| | | | | 1 | | | 3-5 |
| | | | | | 5 | | |
| <i>Ranunculus
longirostris</i> | | | | 1 | | | |
| <i>Sagittaria graminea</i> | | | | 1 | 1-2 | | |
| <i>Subularia
aquatica</i> | | | | 1 | 2 | 2 | |
| <i>Utricularia
resupinata</i> | 1-3 | 2 | 2 | 1 | | 1-2 | 1 |
| <i>Vallisneria
americana</i> | 2&7 | 2-5 | 1-6 | 1-5 | 1-6 | 3-5 | 2-5 |

| | Silver
Bay | Bluff
Head | Sabbath
Day
Point | Huletts
Ldg | Davis
Bay | Kitchal
Bay | Mother
Bunch
Islands |
|---|---------------|---------------|-------------------------|----------------|--------------|----------------|----------------------------|
| <i>Bidens beckii</i> | | | | 3-5 | | 3 | |
| <i>Elatine minima</i> | | 1 | | | 1 | | 1 |
| <i>Elodea canadensis</i> | 1&7 | 1-5 | | 3-6 | | 7 | 5-7&12 |
| <i>Eriocaulon
septangulare</i> | | 1 | | 2 | 1 | 1 | 1 |
| <i>Heteranthera dubia</i> | 1 | 2 | | 2-3 | | 3 | |
| <i>Isoetes
echinospora
macrospora</i> | 1-3
5-9 | | 1-2
7 | 6
4-7 | 1&3
5-6 | 2-5
5-7 | 1-7 |
| <i>Juncus pelocarpus</i> | 3 | | | | | | |
| <i>Lobelia dortmanna</i> | | | | | | | |
| <i>Myriophyllum
alterniflorum
tenellum</i> | 1 | 1-3 | | 1-3 | 1-3
1 | 1 | 3
1 |
| <i>Najas flexilis</i> | 1-9 | 2-7 | 1-7 | 2-9 | 1-7 | 1-7 | 2-3&8 |
| <i>Potamogeton
alpinus
amplifolius
crispus
epihydrus
gramineus
illinoensis
pectinatus
perfoliatus
praelongus
pusillus
robbinsii
spirillus
zosteriformis</i> | 2&5 | | | 2-5 | | 2-5 | 3 |
| | 1-7 | 1-3 | 1-7 | 2-7 | 1-5 | 1-3 | 1-3 |
| | 1,5-7 | 2 | 5 | 2-6 | 2 | 3-5 | 3 |
| | 5-7 | 2-3&7 | 1&5-7 | 2-3&7 | 2-5 | 3-5 | 2-7 |
| | 5-7 | 3-7 | 5-7 | 2-6
2-7 | | 1-7
2-7 | |
| <i>Ranunculus
longirostris</i> | 1 | 2 | | 3 | | | |
| <i>Sagittaris graminea</i> | 3 | | | | | | |
| <i>Subularia
aquatica</i> | | | | | | 1 | |
| <i>Utricularia
resupinata</i> | 1-2 | | 2 | | | 1 | |
| <i>Vallisneria
americana</i> | 2&5-7 | 1-3 | 3 | 2-6 | | 1-3 | |

| | Black
Mountain
Point | French
Point | Red
Rock
Bay | The
Narrows | North end
Northwest
Bay | Walker
Point | West side
Tongue Mt. |
|--|----------------------------|-----------------|--------------------|----------------|-------------------------------|-----------------|-------------------------|
| <i>Bidens beckii</i> | 1 | | 5 | 5 | 3-5 | | |
| <i>Elatine minima</i> | 1 | | | 1-2 | | 1 | 1 |
| <i>Elodea canadensis</i> | | 2 | 5&9 | 7&10 | | 1&7 | 5-7 |
| <i>Eriocaulon
septangulare</i> | 1 | 1-2 | 1 | 1-2 | 1 | 1 | 1 |
| <i>Heteranthera dubia</i> | | 2 | 2-3 | 2-3 | 3 | | 2 |
| <i>Isoetes
echinospora
macrospora</i> | 3
5-8 | 2&5
3-7 | 1&3
3-7 | 1&3-5
1-7 | 1-5
3-7 | 3-5
5-7 | 1-3
5-7 |
| <i>Juncus pelocarpus</i> | | | | 1-3 | | | |
| <i>Lobelia dortmanna</i> | | | | | | | |
| <i>Myriophyllum
alterniflorum
tenellum</i> | | | 3
1 | 3
3 | 2 | 1-2 | 1 |
| <i>Najas flexilis</i> | 2-5 | 2-5&9 | 1-7 | 1-7 | 2&5 | 1-5 | 1-5&9 |
| <i>Potamogeton
alpinus
amplifolius
crispus
epihydus
gramineus
illinoensis
pectinatus
perfoliatus
praelognus
pusillus
robbinsii
spirillus
zosteriformis</i> | 1-3 | 3
2-5 | 3
1-2 | 3-5
1-5 | 2-3
2-5 | 1-5 | 3
1-2&5 |
| | 3-5 | 5 | 2-5 | 2-5 | 2 | | 1&3 |
| | 2-7 | 5&9 | 2-5 | 1-7 | 2-7 | 1-5 | 3 |
| | 5-7 | 5-7&10 | 1-9 | 2-7 | 3-9 | 7-9 | 2-3&7
2-9 |
| <i>Ranunculus
longirostris</i> | 1 | 2 | | | 3 | | |
| <i>Sagittaria graminea</i> | | 1 | | 1 | 1 | | |
| <i>Subularia
aquatica</i> | 1 | | | | | 1-2 | 1 |
| <i>Utricularia
resupinata</i> | | | 1 | | | 1-2 | 2-3 |
| <i>Vallisneria
americana</i> | 2-5 | 2-5 | 1-5 | 2-5 | 2-5 | 1 | 2-5 |

| | Montcalm
Point | Green
Island | Shelving
Rock
Bay | Huddle
Bay | Dome
Island | Phelps
Island | Point
Comfort
Bay |
|--|-------------------|-----------------|-------------------------|---------------|----------------|------------------|-------------------------|
| <i>Bidens beckii</i> | 2 | 3-5 | | 2-3 | | | 1-3 |
| <i>Elatine minima</i> | 1 | 1-2 | | | 1-2 | | 1 |
| <i>Elodea canadensis</i> | 3-7 | 2-7 | 7-9 | 1-3 | 1-2 | | 1-8 |
| <i>Eriocaulon
septangulare</i> | 1-2 | 2 | 1 | | 1-2 | | 1 |
| <i>Heteranthera dubia</i> | 2-3 | 2-3 | | | 1-5 | | 1-3 |
| <i>Isoetes
echinospora
macrospora</i> | 3-7
5-7 | 5-7 | 1 | 3
7-8 | 1-2
7 | 1-3
5-8 | 3-8 |
| <i>Juncus pelocarpus</i> | 1-2 | | | | | | |
| <i>Lobelia dortmanna</i> | | | | 1 | 1 | 1-2 | |
| <i>Myriophyllum
alterniflorum
tenellum</i> | 1-3
3 | 2-3 | | | 1-2
1-2 | 2 | 1 |
| <i>Najas flexilis</i> | 1-3 | 1&3-5 | 1-2&5 | 1&3-5 | 1-7 | 2-5 | 2-5 |
| <i>Potamogeton
alpinus
amplifolius
crispus
epihydus
gramineus
illinoensis
pectinatus
perfoliatus
praelongus
pusillus
robbinsii
spirillus
zosteriformis</i> | 2-5 | | | 2-5 | | | 3-5 |
| | 1-3 | 2-3 | 1-3 | 1-5 | 1-5 | 2-5 | 1-3 |
| | | | 1 | | | | |
| | 2&5 | 3-5 | 2-5 | 1-5 | 2-5 | 4-5 | 1-3 |
| | | | 5 | 5 | | | 3-5 |
| | 1-7 | 1-5 | 5 | 1-7 | 1-5 | 4-5 | 1-3 |
| | 2-5 | 5-7 | 3-9 | 1-7 | 5-7 | | 1-3 |
| | | | 3-5 | 1-5 | | | |
| <i>Ranunculus
longirostris</i> | | 3 | | 1-2&5 | | | 1-3 |
| <i>Sagittaria graminea</i> | | 1-3 | 1 | 1-2 | | | 1 |
| <i>Subularia
aquatica</i> | 1 | | | | | | 1-2 |
| <i>Utricularia
resupinata</i> | 2-3 | | | | | | 1 |
| <i>Vallisneria
americana</i> | 2-5 | 2-5 | 2 | 1-5 | 1-7 | | 1-5 |

| | Boon
Bay | Sandy
Bay | Warner
Bay &
Cove | Harris
Bay | Dunham
Bay | Orcutt
Bay |
|--|-------------|--------------|-------------------------|---------------|---------------|---------------|
| <i>Bidens beckii</i> | 1-3 | 5 | 1-3 | 3 | | |
| <i>Elatine minima</i> | 1 | | 1 | | | |
| <i>Elodea canadensis</i> | 1-3&9 | 5 | 1-5 | 1,3-5 | 1-5 | 1 |
| <i>Eriocaulon
septangulare</i> | 1 | | 1 | | | 1 |
| <i>Heteranthera dubia</i> | 1-3 | 5 | | 1-2 | 1 | |
| <i>Isoetes
echinospora
macrospora</i> | | 5 | 3
3&5 | 3 | | |
| <i>Juncus pelocarpus</i> | | | | | | |
| <i>Lobelia dortmanna</i> | | | | | | |
| <i>Myriophyllum
alterniflorum
tenellum</i> | 2 | | | | | |
| <i>Najas flexilis</i> | 1-5 | 2-5 | 1-3 | 1-2 | 1&5 | 1 |
| <i>Potamogeton
alpinus</i> | | | 1 | | | |
| <i>amplifolius</i> | 2-3 | 3-5 | 2-5 | 2-5 | 2-3 | |
| <i>crispus</i> | | | | 1 | | |
| <i>epihydrus</i> | | | | 1 | | |
| <i>gramineus</i> | 1-2 | 2-3 | 1-3 | 1-3 | 1 | 1-3 |
| <i>illinoensis</i> | | | 5 | | | |
| <i>pectinatus</i> | | | | | 1 | |
| <i>perfoliatus</i> | 1-3 | 2-5 | 1-3 | 1-3 | 1&5 | 1 |
| <i>praelongus</i> | | 5-6 | 2-5 | 2-6 | 2-5 | |
| <i>pusillus</i> | 1-7 | 3-5 | 1-7 | 1,3-5 | 5 | 1&3 |
| <i>robbinsii</i> | 1-5 | 2-6 | 1-7 | 1-7 | 3-5 | |
| <i>spirillus</i> | 1 | | | | | |
| <i>zosteriformis</i> | | | 2-3 | | 1&5 | 3 |
| <i>Ranunculus
longirostris</i> | 1 | | 2 | 3 | | |
| <i>Sagittaria graminea</i> | | | 1-3 | 1-3 | 1 | 1 |
| <i>Subularia
aquatica</i> | 1 | | | | | |
| <i>Utricularia
resupinata</i> | 1 | 1 | | | 1 | 2-3 |
| <i>Vallisneria
americana</i> | 1-5 | 2-6 | 1-5 | 1-5 | 1-5 | 1-2 |

| | Diamond
Island | Tea
Island | Lake
George
Village |
|---|-------------------|--|---------------------------|
| <i>Bidens beckii</i> | | 3 | 3 |
| <i>Elatine minima</i> | | 1-2 | |
| <i>Elodea canadensis</i> | 1&5-10 | 2-7 | 3-10 |
| <i>Eriocaulon
septangulare</i> | | 1 | |
| <i>Heteranthera dubia</i> | 2-3 | 2 | 3 |
| <i>Isoetes
echinospora
macrospora</i> | 5 | 2
2-7 | 5-6 |
| <i>Juncus pelocarpus</i> | | | |
| <i>Lobelia dortmanna</i> | | | |
| <i>Myriophyllum
alterniflorum
tenellum</i> | 2-3 | 1 | |
| <i>Najas flexilis</i> | 1-5 | 2-5 | 3 |
| <i>Potamogeton
alpinus
amplifolius
crispus
epihydrus
gramineus
illinoensis
pectinatus
perfoliatus
praelongus
pusillus
robbinsii
spirillus
zosteriformis</i> | 1-5 | 5
2
2-3
2-3
3-6
2-7
2-7
2-3 | 3
3-7 |
| <i>Ranunculus
longirostris</i> | | 2-3 | 3 |
| <i>Sagittaria graminea</i> | | 2 | 3 |
| <i>Subularia
aquatica</i> | | | |
| <i>Utricularia
resupinata</i> | | 1 | |
| <i>Vallisneria
americana</i> | 2 | 2-5 | 3 |

GLOSSARY

- achene:** a small, dry fruit with a single seed that is free from the fruit wall. The fruit wall does not open naturally to release the seed.
- acute:** pointed or forming less than a right angle.
- adnate:** unlike parts united or fused together. See **connate**.
- alternate:** any arrangement of parts that are not opposite or whorled.
- anther:** that portion of the stamen in which the pollen grains are formed.
- apex:** the tip or extreme end.
- arcuate:** curved or arched.
- aroid:** pertaining to a member of the arum family (Araceae).
- auricle:** an earlike lobe or appendage.
- awl-shaped:** gradually tapering from the base to a slender point.
- awn:** a long stout or stiff bristle.
- axil:** the upper angle between an organ and its axis such as a leaf attached to a stem.
- basifixed:** attached by the base or lower end.
- berry:** a fruit which, except for the seeds, is completely fleshy.
- bilaterally symmetrical:** with two vertical planes of symmetry.
- bisexual:** having both sexes in the same flower.
- bladder:** an inflated structure.
- blade:** the expanded portion of a leaf as distinct from the petiole.
- bract:** a small leaf, usually subtending a part of an inflorescence.
- bristle:** a stiff hair.
- calyx:** the outer part of a flower, composed of sepals.
- capsule:** a dry fruit formed from two or more carpels, which open at maturity exposing the seeds.
- carpel:** a single modified seedbearing leaf that alone or fused to others forms a fruit.
- caryopsis:** similar to an achene but with the seed coat fused to the fruit wall. Found only in the grasses.
- cauline:** pertaining to the stem.
- centimeter:** ten millimeters or two-fifths of an inch.
- ciliate:** with marginal hairs or bristles.
- clavate:** gradually enlarged upward. Shaped like a club.
- compound:** formed of a number of similar parts, as a leaf made up of two or more leaflets or a fruit of two or more carpels.
- connate:** similar parts united or fused together. See **adnate**.
- cordate:** heart-shaped.
- coriaceous:** leathery.
- corolla:** the petals of a flower.
- culm:** the stem of a grass or a sedge.
- cyme:** a somewhat flat-topped cluster of flowers in which the central flowers open slightly in advance of the outer ones.
- decumbent:** reclining but with tip usually ascending.
- decurrent:** extending down the stem from the point of attachment.
- dehiscent:** process of opening which releases pollen or seeds.
- dentate:** with teeth projecting at right angles, such as on a leaf margin.
- denticulate:** finely dentate.
- dioecious:** having male and female sex organs on separate individuals, such as pollen produced by one plant, seeds by another.
- disk:** an enlargement of the tip of the peduncle bearing the tiny flowers in the family Compositae.
- dissected:** divided into narrow segments.
- dorsal:** the back or outer side.
- embryo:** the rudimentary plant within a seed.
- emersed:** extending above the water surface.
- endocarp loop:** the tissue that projects as a fold into the center of the fruit of *Potamogeton*.

entire: with an unbroken or even margin, without teeth or other indentations, such as the smooth margin of a leaf.

fertile: productive. Capable of producing seeds, pollen, or spores.

filamentous: like a thread.

filiform: threadlike. Long and slender.

flaccid: limp.

floret: a tiny flower. Usually used to indicate a flower in a cluster of flowers.

foliaceous: having leaves.

follicle: a dry fruit of one carpel that splits on one side.

frond: the leaf of a fern. Sometimes used to describe the plant body in the Lemnaceae.

fruit: a mature ovary with enclosed seeds; sometimes including other adherent parts.

glabrous: without hairs, bristles, or scales.

glandular: having secreting organs or glistening bodies.

glaucous: covered with a powdery bloom, which is easily rubbed off.

glomerule: a small compact, more or less rounded cluster.

glume: one of a pair of empty scalelike bracts at the base of a grass spikelet.

head: a dense inflorescence of sessile or subsessile flowers on a short or broadened axis.

hispid: having stiff, bristly hairs.

indehiscent: not opening. See **dehiscent**.

inflorescence: a flower cluster.

internode: portion of a stem between nodes.

interstitial: referring to the space between particles.

involucrel: a secondary involucre that subtends a part of an inflorescence.

involucre: a whorl of bracts subtending an inflorescence.

keel: a prominent ridge.

lacuna: a large intercellular cavity.

lanceolate: lance-shaped, much longer than wide, widest below the middle and tapering to the apex.

leaflet: one of the divisions of a compound leaf.

lemma: a bract that usually encloses a flower in the spikelet of grasses.

lenticular: lens-shaped, biconvex with two edges.

ligule: a strap-shaped corolla bract of some flowers in the family Compositae. A membranaceous appendage at the juncture of the blade and sheath of grasses and similar plants.

linear: narrow with parallel sides.

littoral: along the shore.

lobe: a partial division of a plant organ, such as a deeply cut part of a leaf, petal, etc.

megaspore: a female spore, usually the larger when both male and female spores are produced.

membranous: thin, flexible and more or less translucent.

-merous: a suffix which taken with a numerical prefix indicates the number of each of the floral parts.

midrib: the middle vein of a leaf or other structure.

millimeter: one-tenth of a centimeter or one twenty-fifth of an inch.

monoecious: having pollen and seeds in separate flowers, but on the same plant.

mucronate: a short, sharp point at the tip of a rounded apex.

node: position on the stem where a leaf, a bud, or a branch is attached.

nodose: knotty, knobby, or having prominent nodes.

nutlet: a small nut. Often used to include any small, thick-shelled, seedlike fruit.

obovate: inverted ovate, egg-shaped with the attachment at the smaller end.

obtuse: blunt, usually forming more than a right angle.

ocrea: a stipular sheath surrounding the stem.

opposite: two parts at a node on opposing sides of a node.

ovary: the basal portion of a pistil containing one or more seeds.

ovate: egg-shaped with the attachment at the larger end.

palmate: with parts diverging from a common base, as fingers of a hand.

panicle: an elongate inflorescence with compound branching.

papillate: bearing minute pimplelike protuberances.

pedicel: the stalk of a single flower or fruit. The ultimate branch of a peduncle.

peduncle: the stalk, including branches, of an inflorescence.

peltate: attached by the lower surface, not by the margin.

perfoliate: descriptive of a leaf having the stem apparently passing through it because of a joining or overlapping of the basal lobes.

perianth: the calyx and corolla collectively or either one when only one is present.

perigynium: a modified leaflike structure that surrounds the ovary, such as the inflated sac in *Carex*.

perigynous: borne around the ovary, rather than below or above.

petal: one of the parts of the corolla or inner leaflike parts of a flower.

petiole: the stalk of a leaf.

pilose: with rather sparse, soft hairs.

pinnate: having the parts arranged in two rows along the common axis.

pistil: the female reproductive part of a flower.

pith: the central, soft tissue of a stem.

plano-convex: flat on one side and convex on the other.

raceme: an inflorescence having an elongate axis bearing single flowers on pedicels.

rachis: the central axis of an inflorescence or compound leaf.

radically symmetrical: having more than two planes of symmetry.

rank: a vertical row. Leaves that are 2-ranked are in two vertical rows; 3-ranked in three vertical rows.

receptacle: the floral axis to which the flower parts are attached.

rhizome: a modified, underground stem. Distinguished from a root by having buds or scalelike leaves.

rootstock: the basal thickened portion of a stem where the roots are attached.

rosette: a basal cluster of leaves produced on a very short stem.

sac: shaped like a bag or pouch.

sagittate: shaped like an arrowhead. Similar to cordate but with pointed basal lobes.

scabrous: rough to the touch because of tiny, stiff hairs or other projections.

scale: thin membranous structure, such as a chafflike bract or a flattened hair.

scape: a peduncle arising at ground level from a very short stem.

scuba: self-contained underwater breathing apparatus.

sepal: one of the parts of the calyx.

serrate: with fine, sharp teeth that are inclined toward the tip.

sessile: without a stalk, as with some leaves and flowers.

sheath: a tubelike part surrounding another part, such as the lower part of a grass or sedge leaf that is wrapped around the stem.

silique: a dry fruit that splits open leaving a thin partition. Found in the Cruciferae.

spadix: a spike of flowers on a fleshy axis.

spathe: a single large bract subtending an inflorescence, which is usually a spadix.

spike: an elongated, unbranched inflorescence of sessile flowers.

spikelet: a tiny spike, usually used for portions of the inflorescence of the grasses and sedges.

spinulose: minutely spiny.

sporangium: a structure containing spores.

spore: single reproductive body of plants that does not produce seeds.

stamen: the pollen-bearing organ of the flower.

staminate: having male but not female reproductive organs.

sterile: without sexual reproductive parts.

stigma: the part of a pistil on which pollen adheres and germinates.

stipule: a pair of appendages that may be present at the point of attachment of a leaf to a stem.

stolon: a modified above-ground horizontal or arched stem that produces new plants at the nodes.

striae: narrow lines, streaks, grooves, or channels.

strigose: covered with straight appressed hairs.

style: the stalklike part of some pistils connecting the stigma and the ovary.

supra-axillary: attached above the axil.

terete: circular in cross section.

tetrad: a group of four.

trigonous: three-angled.

trimorphic: having three forms. Having three kinds of flowers which differ in the relative length and placement of stamens and stigmas.

tuber: a modified portion of a rhizome, being thick and fleshy.

tubercle: a small swollen structure.

umbel: an inflorescence having peduncles of nearly equal length and attached at a common point. It is usually flat-topped and may be simple or compound.

undulate: wavy.

unisexual: of one sex only; staminate or pistillate.

vein: a bundle of externally visible transporting tissue in a leaf or other organ.

venation: the pattern of veins in an organ.

ventral: the under or inner side.

versatile: attached by the middle and free to swing as with some anthers.

whorl: a group of three or more parts at a node.

winter bud: shortened and hardened tips of branches with crowded leaf blades, which serve to survive the winter and germinate the next season.

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KANIEN'KÉHA' OKARA'SHÓN:'A

Mohawk Stories

**Josephine Horne
Annette Jacobs
Carolee Jacobs
Frank Jacobs Jr.
Dorothy Ann Lazore**

**Dorris Montour
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**Rita Phillips, Illustrator
Marianne Williams, Editor**



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PREFACE

The Mohawk people, like many other Native American tribal groups, have placed a high priority on the retention of the Mohawk language by their children. This is evidenced by the extensive language programs in operation in the schools that Mohawk children attend, both in Canada and in the United States.

Kanien'kéha' Okara'shón:'a (Mohawk stories) is a welcome addition to the limited resources available to the Mohawk language teachers at this time. The authors are to be commended for the effort put into recording this portion of a rich cultural heritage. This pioneer work in writing the Mohawk language will benefit many of our people for years to come.

Philip H. Tarbell
Specialist in Indian Culture

OH NAHO:TEN' KAHIA:TON'

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INTRODUCTION

The legends, histories, anecdotes, omens, and poetry collected here were written down by Mohawk teachers from Caughnawaga and Oka for their children. Most of the legends have been around for a long time, handed down from one generation to the next. Like any oral literature, they have been recounted so many times that they are no longer remembered as the property of a single person but have come to be part of the cultural heritage of all Mohawk people.

A characteristic of most oral literature is its variety. Each legend has many versions, and the ones collected here are no exceptions. Any good storyteller is bound to make small changes with every performance, embellishing here, only alluding to an event or detail there. The versions presented here are not considered any more definitive or authentic than any other. The observant reader will notice that even within this volume, the same tale appears in two versions.

Because this book is intended primarily for young people, many of whom are just learning the language, two kinds of translations have been included in the second section. Directly under each Mohawk line, are word by word translations. Their purpose is to provide the reader with a glimpse of some of the imagery present in the Mohawk. Word by word translations can never be perfect, however, because no single word in one language embodies the same connotations, ambiguities, presuppositions, and level of abstraction as one word in another. Sometimes a concrete term in English has been chosen for a word used abstractly in Mohawk, in order to reveal the imagery of the Mohawk. Number on nouns and tense on verbs need not always be specified in good Mohawk, yet it is not possible to separate number from nouns and tense from verbs in English, so arbitrary choices must be made, and different people have made different choices.

The word-by-word translations can sometimes capture some of the imagery, but they can never convey the richness of the Mohawk style. In order to approximate an English stylistic equivalent, the teachers have retold the tales in English. This appears at the bottom of each page. Since these are retellings, and not translations, some details vary slightly from the Mohawk version to the English. As all of the teachers have remarked, a certain amount of color and wit must be lost in the retelling.

This observation should serve only to spur on younger readers to devote even more energy to their study of Mohawk so that they, too, may appreciate fully the original versions.

Wariá:nen Io'nikonhrf:io

Marianne Williams
Editor



ONKWEHSHON: 'A SEWATAHONHSATAT

Onkwehshón: 'a

Ietshiiatahónhsatat oh nahó:ten'
ionkhihsothokon'kénha' rón:ton'.

Onkwehshón: 'a

Shé:kon ionkwahronkátie'
ionkhihsothokon'kénha' raotiwén:na'.

Onkwehshón: 'a

Ionkhihsothokon'kénha' rón:ton',
"Thó nonkwá ionsásewe'
tsi nisewaweiennó:ten tánon'
tsi nitesewehtáhkwen."

Onkwehshón: 'a

Ionkhihsothokon 'kénha' rón:ton',

"Thó nionsásese' tsi nonkwá:ti ne orihwaká:ion."

Onkwehshón: 'a

Ionkhihsothokon 'kénha' rón:ton',

"Sásawatst ne sewawén:na'."

Onkwehshón: 'a

Ionkhihsothokon 'kénha' rón:ton',

"Ietshiiatahónhsatat ne kontíriio'

tsi nahó:ten' rón:ton'."

Onkwehshón: 'a

Ionkhihsothokon 'kénha' rón:ton',

"Ietshiiatahónhsatat ne otsi'ten'shón:'a

tsi nahó:ten' rón:ton'."

Onkwehshón: 'a

Ionkhihsothokon 'kénha' rón:ton'.

"Ietshiiatahónhsatat ne otsi'nonwahshón:'a

tsi nahó:ten' rón:ton'."

Onkwe'shón:'a

Ionkhihsothokon'kénha' rón:ton',
"Ietshiiatahónhsatat ne ononhkwa'shón:'a
tsi nahó:ten' rón:ton'."

Onkwehshón:'a

Ionkhihsothokon'kénha' rón:ton',
"Ietshiiatahónhsatat tsi karhahrónnion'
tsi nahó:ten' rón:ton'."

Onkwehshón:'a

Ionkhihsothokon'kénha' rón:ton',
"Ietshiiatahónhsatat tsi kanientarahrónnion'
tsi nahó:ten' rón:ton'."

Onkwehshón:'a

Ionkhihsothokon'kénha' rón:ton',
"Ietshiietahónhsatat ne ratiweraráhstha'
tsi nahó:ten' rón:ton'."

Onkwehshón:'a

Ionkhihsothokon'kénha' rón:ton',
"Sewatahónhsatat ne tlohkehnéhkha' karáhkwa'
tsi nahó:ten' wá:ton'."

Onkwehshón: 'a

Ionkhihsothokon'kénha' rón:ton',
"Sewatahónhsatat ne ahsonthénkhka' karáhkwa'
tsi nahó:ten' wá:ton'."

Onkwehshón: 'a

Ionkhihsothokon'kénha' rón:ton',
"Sewatahónhsatat ne otsistohshón: 'a
tsi nahó:ten' rón:ton'."

Onkwehshón: 'a

Ionkhihsothokon'kénha' rón:ton',
"Ietshiiatahónhsatat ne ietshihsothó:kon'
tsi nahó:ten' rón:ton'."

Onkwehshón: 'a

Ionkhihsothokon'kénha' rón:ton',
"Ietshiiatahónhsatat ne ionkhi'nisténha ohwén:tsa
tsi nahó:ten' ión:ton'."

Onkwehshón: 'a sewatahónhsatat

Tekaronhió:ken





THARONHIAWA:KON

Tharonhiawá:kon, né kén:ton' ráhawe' tsi
 karonhiá:te' ronónha' raotiní:io ne rononkwehón:we.
 Shako'nikón:rare' tánon' shakoia'tanonstá:ton.
 Karonhiá:ke nithawé:non otsható:kon, watshatará:ken,
 e' thó wahoké:tohte'.

Wahshakona'tón:hahse' tánon' tahshakó:ion',
 ne rononkwehón:we nattokháhtshera, nahontó:rate',
 nahontátenonte', tánon' tsi nahatí:iere' nahatikwatá:ko'
 ne raonatsherónnia'. Wahshakona'tón:hahse' ononhkwa'-
 shón:'a, tánon' ohtehra'shón:'a, nahotítsen'te'.
 Wahshako'satsténhseron' tánon' rotirihwakwaríhsion tsi
 rón:ne's. Tahshakó:ion' ne ó:nenhste', wahshakona'tón:-
 hahse' ka' nón nahatitshén:ri' ne onatsakén:ra,
 o'niónkseri, osahé:ta', tánon' onon'ónsera.

Rao'nikón:ra' thatenniéhtha' tsi ní tsi ronatétshens
thó ní tsi rotitokenhsehátie' tsi neniawénhseron'.

Khwató:ken na'tekónteron tsi ronwá:kens enhshakorihónnien'
nahó:ten' ioiánere's ahonnón:ni'. Kwáh skenén:'a
tahshakowihátie' kaia'torehtatsherí:io. Ronaterí:iohkwe'
ó:nen ronwatishennionhátie', thontaiawénhstsi', kén'
nahatí:iere', Tharonhiawá:kon wahoké:tohte'. Wahén:ron',

"Tóhsa' tesewa'nikonhrhá:ren."

Akte' nonsakaié:ra'te' tsi ronaterí:io
wahontkwé:ni'.

Tharonhiawá:kon, wahshako'nikonhráta' ne Tekanawí:ta,
tánon' Aié:wate' nahianitiohkón:ni' ne Kaianere'kó:wa.
Kí:ken Tekanawí:ta, tánon' Aié:wate', kwáh í:ken tsi
nihsennowanén:ne', Huron thohténtion ne Tekanawí:ta,
ok ne Aié:wate', kanien'kehró:non'. E:so'wahianonhton-
nión:ko' tsi nahní:iere' nahianitiohkón:ni'. E:so'
iohserá:ke wahotiió'ten' tsi wahianitiohkwahserón:ni',
Tharonhiawá:kon é:so'wahshako'nikón:ron' tsi nahonní:iere'
ne tóhsa' taonteríhsi' ne Kaianere'kó:wa né:ne tsi
nén:we' enkatátie'. Wahní:ron' tsi nikarí:wes
enkahwatsiratátie' tánon' entkarahkwinekénhseke', óhente'
entkanióhseke' tánon' ohné:kanos kón:ne's é' thó
nikarí:wes enkatátie' ne Kaianere'kó:wa.

Aié:wate', wahakwé:ni' wahona'tón:hahse' ne
 Atotárho, ononta'kehró:non' nahaia'tó:ten, né:ne
 aonhá:'a thronkwe'táksen, wahohró:ri' tóka'enháhsere'
 ne Kaianere'kó:wa tsi tenkaté:ni' tsi rónnhe', e' thó
 ki na'á:wen'ne'. Wahaié:na' ne Kaianere'kó:wa
 wa'thatté:ni', iah teshronkwe'táksen, wahotinenhrá:ko'
 ne ononta'kehrón:non' tsi ní tsi tehotté:nion ne
 Roiá:ner Atotárho, akwé:kon wahonní:ron',

"Teionkwatonhwentsó:ni aiakwáhsere' ne Kaianere'kó:wa."

Aié:wate' akwé nontá:rehte' ne wísk nihononhwentsá:ke,
 Kanien'kehá:ka', Oneniothá:ka', Ononta'kehá:ka',
 Kaio'konhá:ka', tánon' Shotinontowane'há:ka', wahshako-
 hró:ri' tsi niioiánere' ne akwé skáthne aontahontihéntho'
 tánon' akwé skén:nen'ahón:ton' ne onkwehón:we. Kwáh
 ionehrákwa' tsi niioiánere' tsi ní tsi wahnikwatá:ko'
 notióhkwa' iáh ne té:ken ne iosnó:re' aonnitiohkwaríhsi'
 nok né:ne tsi nén:we'. Akwé wahatirihwanón:wehne'
 nahatíhsere' ne Kaianere'kó:wa. Wisk-niwáhsen nihá:ti
 Rotiiá:ner, wahontkennísa' katsénhakon. Wísk na'thatí-
 nerenke' ne kaién:kwire', ne kén:ton'tsi ó:nen wísk
 nihononhwentsá:ke ia'thóntieste'. Enhati'shátsten'ne'
 skáthne enthontihéntho' skén:nen' enhón:ton'. Kaié:ri-
 iawén:re' tewen'niáwe' tánon' wísk-niwáhsen shiiohseró:ten
 nihonanitiohkón:ni. Oh na'kénhkhá' ne Tuscaroras

ronatiá:tare'. Iá:ia'k nihononhwentsá:ke wahón:ton'.
Enska ne tsóhsera ronnitiohkwaró:rokskwe' ne wísk-
niwáhsen nihá:ti Rotiiá:ner, katsénhakon enhontkennísa'
nek ratihá:wi ne raoneriáhsakon ne skén:nen' tánon'
ne karihwí:io nek enhonnonhtonnión:ko' ne akwé ahoti-
iáneren'ne' ne raononkwe'ta'shón:'a. Wahatiweien-
téhta'ne' tahoti'nikonhraién:ta'ne', iáh ní ó:nen
tha'teshontatetshá:nis. On:wa' wenhniserá:te tewehiá:ras
né:ne Iá:ia'k Nihononhwentsá:ke, tsi ronónha ronanitsoh-
kwí:son ne Kaianere'kó:wa.

Kahnawá:ke iá:ken' nohná:ken Tharonhiawá:kon
shonwá:ken, ákta' ne Tiohtiá:ke. Tho ní tsi shohténtion
tsi ní tsi thawé:non otsható:kon tsi karonhiá:ke
nionsá:re'.

Warisó:se Kaieríthon



SHA 'TEWAHSIRÍ:HEN

O:nen ki ní:'i nakká:ra'

Wahón:nise' iá:ken'ki rón:kwe, ro'níha skáthne ní:teron'. O:nen ki rón:kwe wahó:niake' tánon' ne ró:ne' iakotahkontá:ni' tsi thó rén:teron' ne rokstén:ha.

Sok ki rón:kwe iahotó:ri' ne roién:'a iahoia'ténhawe' ne rohsótha tánon' karhá:kon iahóhtka'we'. Kí rón:kwe áhsire' tahó:ion' ne roién:'a tahohsirawén:'eke' ne rohsótha nó:nen ienhóhtka'we' karhá:kon.

O:nen iá:ken'ki raksá:'a iahoia'ténhawe' ne rohsótha. Tsi ó:nen iahá:newe' ne karhá:kon, sok ki raksá:'a ahsén:nen wa'throhwíha' ne áhsire'. Tho ki' tahóhtka'we' ne rokstén:ha tánon' tontahahtén:ti' shahá:wi' ne sha'tewahsirí:hen.

Kí rón:kwe wahori'wanón:tonhse' ne roién:'a oh
nontié:ren tsi sha'tewahsirí:hen shahá:wi'. Ki raksá:'a
wahohró:ri' ne ro'níha, "Ki sha'tewahsirí:hen sekhá:wi',
enkatatién:hahse', Nó:nen í:se' ensakstén:ha'ne' ne
én:katste' tenkoniahsirawén:'eke' nó:nen karhá:kon
ienkoniahhtka'we'."

O:nen iá:ken^h ki rón:kwe wahanonhtonnión:ko' tsi
nahá:iere', sok wahohró:ri' ne roién:'a aonsahonónksa'
ne rohsótha.

Kí:ken oká:ra' ne né:'e kén:ton ne tóhsa'
aionkhiiatahkón:tahse' ne onkwe'taká:ion's. Tá:we' ne
ohnísera, í:'i káti' ó:ni entionkwaién:ta'ne'.

Konwatién:se'

RAWE:RAS RO:NE'

Karhá:kon thati'terón:tahkwe' iá:ken' kǐ:ken
kahwá:tsire'. Tóhka' nihotiwí:raien'. Kháre' ɔ:nen
kǐ:ken wahonwatinatahré:nahse' kaná:takon thatiná:kere'
rontatenonhkwe' wahontshenon:ni' ki:ken ne shakoti-
ien'okón:'a tsi ɔ:nen wahonatero'seraién:ta'ne'.

O:nen ki' iá:ken' karhá:kon niahatitakhenɔntie'
wahonhiákha' sewahiɔ:wane', thontaiawénhstsi'
taie'nahkwáweron' tsi na'okén:nore'. Tewanine'kara'wánions
tánon' teio'tónhahre' iowé:ren tánon' wa'tkawerataǎ:se'
khé kǐ' é' thó okwiró:kon wahontáhsehte' ki:ken
na'tewatenón:ianihte' tánon' iá:ken' é' thó niiohsnó:re'
ontóhetste' tánon' ontoríshen'. Tontakarahkwíneke'ne'.
Sanwenhniserí:iohste' nek tsi akwé:kon kǐ ioná:nawen.

E' thó kǐ:ken ne ratiksa'okón:'a wahontahrakétsko'
kwáh iá:ken' énhsehre' sha'tekarhí:hen wa'tiekháhsi tsi
na'tonsaiohswáthe'ne' tánon' ahsén:nen nón:we tsi
tekeniiáhse tekeniksá:'a wa'onatshatárhahse'. O:nen
wa'thiáttoke' tsi iakón:kwe tsi iakote'wháhsate'
kǐ:ken wa'tkenikahrá:ra'ne'. O:nen kwáh ohtekén:'en
wa'kenika'én:ion' tsi iakón:kwe kǐ:ken kwáh tsi
iotérhate' ní:iete'. Isi' ne ká:ti ia'teieká:nere'.
E' thó iá:ken'niiehnén:ies tsi niiokwí:res kahon'tsistóskon
iakótston tó:k niiako'khá:res tánon' teiakoteweiahere'
tó:k niioisiwiién:tes tsi iakononhwaró:ron tánon'

ionterahkwawerhóhstha' iéhawe' tsenekwá:ti ne ká:ti.
Tsik niió:re' ia'tkenikahraién:ta'ne' e' thó
niiohsnó:re' ka'k thónhte niahá:'en ne iakón:kwe.

Tsi ó:nen ne tekeniksá:'a ionsákenewe' tánon'
satiathró:ri' nahó:ten' wa'tiatkáhtho', wahshakohró:ri'
ne' neksá:'a ronwa'níha,

"Iotahkwáhsa' tsi iáh teietshiwennará:'on
ase'kén rawé:ras ónhte thí:ken ró:ne' wa'etshí:ken'
káti' nón:wa' aietshiiatera'swá:wi'."



Konwatsi'tsaién:ni



AKON:WARA'

Shiikwaksa'okón:'a akón:wara' she's róntstha'
ne rotikstén:ha nahotewiraserón:ni'. Tsi ní:iot tsi
ionkhihró:ri iah ónhka' ne wén:ton teiotón:'on
aiakothró:ri' ne oh nihaia'tó:ten ase'kén akwé:kon
ronenhé:ion tsi niiá:kon ne ronwá:ken. E' thó tsi
na'teiotenonhianíhton nihakonwaró:ten tiótkon'
ahsatakónhson' tehotstikahwenháti'e's ratonkwe'tí:saks
rotateweienentá:'on ahshakoié:na' ne iakaonkwe'táksen
tó:ka' iáh teiontate'nikón:rare'.

Konwatsi'tsaién:ni

AKON:WARA'

E:so'iohserá:ke ó:nen tsi náhe' ne kahwá:tsire'
skáthne ie'terón:tonhkwe' sahsótha sa'nisténha
ia'niha tánon' ratiksa'okón:'a. Kĩ:ken iatathróna'
wá:nehre' ahniia:ken'ne' ahiatkenhnisa'ánha'.
Wahshakotiri'wanón:tonhse' ne akokstén:ha aiontennón:na'
tsi nikarĩ:wes enhotiiakén:'en.

Wa'ĩ:ron' nakokstén:ha, "Ió, nek ki' tsi
shehró:ri tha'tehontó:tat ase'kén e:so' tsi tewak-
wishenhé:ion."

Tsi niiosnó:re' tsi iahniia:ken'ne' óksa'k
tahontáhsawen' ne kanonhsakwé:kon wa'thonrahtáthon'.
Ne rotihsótha tia'teká:konte' ion:ton', "Tha'tesewa-
tó:tat," nek ki' tsi iah ónhka' teiakotahonhsata:ton.
Kháre' ó:nen wahonwatihró:ri', "Tóka' iah tha'tensewa-
totathe' atste ienkwaia'tón:ti' tánon' akón:wara'
ientshisewaia'ténhawe'."

Iáh tha'tehonatotá:ton ratitakhenóntie's
thihshakotie:ron ne akokstén:ha wahshakotina'kón:ni'.
Wa'onte'nién:ten' ahonwatiie:na' ne ratikowá:nens
nek ki' tsi sótsi' tehotĩ:ka. Nakwáh ken' nithrá:'a
rate'niéntha' ahshakona'ké:ren' ne ronátia'ke. Tsi
rotohetstonhátie' tahonwaié:na'. Tsi kanhohká:ronte'

átste iahonwá:reke' wa'í:ron', "Kóh akón:wara'
kí:ken raksá:'a," tánon' saiehnhóhaienhte'.



Kénk nikarí:wes sahonwenhnónksa' ne raksá:'a
iáh teshonwaia'tatshénrion. Iah nonwén:ton
teshonwá:ken ne raksá:'a.

Rake'níha rakkaratón:ni
Niioronhiá:'a

KAIENTEREHSTAHKHWA'

1. Tóka' ensathón:te'ne' ónhka'k taieken'to'ókhon'
tánon' iáh ónhka' té:ien's né kén:ton' tsi ónhka'k
eniaíheie'.
2. Tóka' ensatatshatárhahse' ónhka'k thó í:ien'
tánon' iáh ónhka' té:ien's, né ni' né:'e kén:ton'
tsi ónhka'k eniaíheie'.
3. Tóka' ehtá:ke iorhá:tare' ne ó:nenhste' né kén:ton'
tsi iáh é:so' thakanié:ien'.
4. Tóka' sótsi' ehtá:ke otsi'nahkontahkwá:ne ronatsi'-
nahkón:ni né ni' né:'e kén:ton' tsi iáh é:so' thakanié:ien'.
5. Tóka' ohwhará:ne í:ions tsi kahón:tsi rohá:te' né
kén:ton' tsi eniohseresónhake'.
6. Tóka' okariahtá:ne énhtsken' kanónhskon akohserá:ke
né kén:ton' tsi sénha' enwathó:rate'.
7. Tóka' tensahonhtá:kahre' né kén:ton' tsi thé:nen'
enhserihwá:ronke'.
8. Tóka' tsi'tén:'a onahstonhkwá:ke teniaón:ko' né
kén:ton' tsi iáh tekarihwĩ:io nahó:ten' enhserihwá:ronke'.

9. Tóka' ensahsi'tarónhkhwen' né kén:ton' tsi ká'k
iénhse' tókani' tenhsenonniahkwá'na':

10. Tóka' ensakahrani'kerón:ko' tsi sehsenekwá:ti nekwá
né kén:ton' tsi ensa'nikonhráksen' tókani' ensaná:khwen'.

11. Tóka' ensakahrani'kerón:ko' tsi sehseweientehtáhkwen
nekwá né kén:ton' tsi karihwí:io nahó:ten' enhserihwá:-
ronke'.

12. Toka' ensahsiaronhkhwen' tsi sehsenekwá:ti nekwá
né kén:ton' tsi ónhka'k enhsenéntsha'.

13. Tóka' ensahsiarónhkhwen' tsi sehseweientehtáhkwen
nekwá né kén:ton' tsi ensahwistaién:ta'ne'.

14. Tóka' ná:kon karahkwákta' iostsfisto' né kén:ton' tsi
rón:kwe enhrénheie'.

15. Tóka' é:neken karahkwákta' iostsfisto' né kén:ton' tsi
tsakothonwí:sen eniafheie'.

16. Tóka' ia'tesa'kharaké:tote' né kén:ton' tsi
enhsaten'niotá:na'.

17. Tóka' atókwa ensá:sen'se' né kén:ton' tsi ónhka'k
éntien'.

18. Tóka' ieksohare'tákhkwa' onia'tá:'a ensá:sen'se'

né kén:ton tsi ónhka'k iáh teiakokwéniens eniesanata-
hré:nahse'.

19. Tóka' iáh thasa'nikonhrón:ni' ahsani'tskwakra'tshe-
rakarhátho' né kén:ton' tsi ónhka'k rohné:ka enthatá-
weia'te'.

20. Tóka' ó:niare' ensatetshá:ten' karihwaka'ténhtshera
kén:ton'.

21. Tóka' entéhsia'ke' sanónhkwis nó:nen oráhkwise'
sénha' iohsnó:re' ensewatehiá:ron'.

22. Tóka' tenhsatianakarhátho' né kén:ton' tsi ohkwá:ri
tentsátera'ne'.

23. Tóka' sótsi' é:so' ensaiéshon' iáh tekarihwáhstha'
né kén:ton' tsi tenhsashéntho'.

24. Tóka' owirá:'a oshon'kará:ke rotahónhsate' né
kén:ton' tsi ó:ia' ensehsewirahní:non'.

25. Tóka' tóhka' niionkwé:take eniaíheie' né kén:ton'
tsi Shonkwaia'tíson thotén:niote'.

Tok ní:kon

Wathahí:ne' tánon' Konwatién:se'

TIAWERON:KO KANEHON OKA:RA'

Ne ká:ti' kí:ken oká:ra' wahón:nise' rón:kwe
wahaientakóha'. Skáthne tettiatera'né:ken akohsá:tens.
Tetiate'serehtahnontérha' wahshakoia'taniión:ten'.

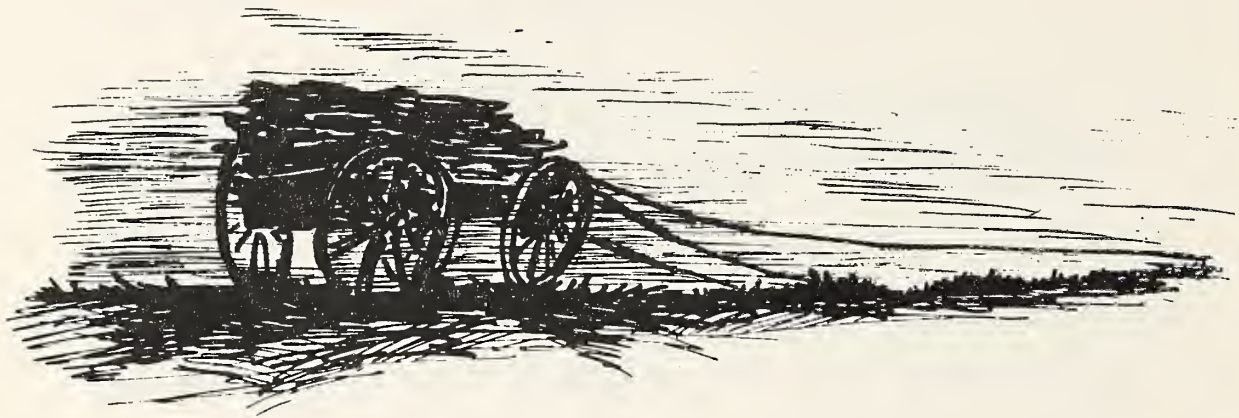
O:nen ká:ti' wahahtén:ti' wahaientakóha' tánon'
né:ne akohsá:tens aonatahkwénnia' tiawerón:ko aoti-
néhon ionniá:ton.

Tsi iahá:rawe' karhá:kon tontáhsawen' wa'okén:-
nore'. Iaháhsa' ki tsi raientákwás tánon' akwé:kon
ka'seréhtakon waháta', sok tontahahtén:ti'. Tsi
tahshakotó:ri' ne akohsá:tens, tetsá:ron tatiatihéntho'
iáh ki' tetiohténtion ne tetiate'serehtahnontérha'.
Aonahkwénnia' wa'tewatirón:ten' khe tka'seréhtaien'
karhá:kon.

Ionsá:rawe' tsi thonónhsote' tánon' wahshakoh-
kwenniahrá:ko' ne akohsá:tens tánon' aten'enhrá:ke
wahrotárhoke' ne aonahkwénnia'.

Tsi niwahsón:tes onstáthen' ne tiawerón:ko
aonéhon sok tontáhsawen' ontó:roke'.

Orhon'ké:ne wahá:ie' iahatke'tó:ten' tsi
tekatsiserá:ton' wahonehrá:ko' tsi nahó:ten' wahatkáththo'.
Thó aten'enhrákta' ka'seréhtaien' ne tetiate'sereh-



tahnhontérha' tetkaiéntáhere', ne roientákwen.

Wahón:nise' shihatiká:ratons ne thotf:ien'skwe'.

Takaronhió:ken



IEHWISTA'EKSTHA'

Ne kí:ken aoká:ra' tsi iohwistén:ton teieiahson'thá:ke ononhsatokenhtí:ke. Wahón:nise' o'seronni'ón:we ronontí:io wahshakorharátsten' Kahnawa'kehró:non' tsi enhshakó:ion' iehwista'ékstha'. E' thó kí'na'á:wen'ne', tahaténniehte' kahonweia'kowáhne tahonnéta', Kahnawá:ke taiawenonhátie'.

Ne' thó nón shontakahá:wi o'seronni'ón:we tánon' tiorhó:shaka'ón:we ronateriióhne'. Iah té:io ne iehwista'ékstha' né tsi wa'konwaié:na' ne kahonweia'kó:wa, iahatíhawe' wastohronón:ke, takarhárho', wathonnetáhkó' tsi nahó:ten' wá:tahkwe' ne kahón:wakon. Akwé wahonten-hní:non', é' thó wa'karátie' ne iehwista'ékstha'. Tsi nón tkaná:taien' ne Deerfield thatinákere' wahatihní:non'.

Kháre' ó:nen wahotinónhton'ke' naón:we'ne raotihwísta'. Wahatirihwí:sake' ka' nieiawé:non. Wahatirihwatshén:ri' tsi wa'konwaié:na' ne kahonweia'kó:wa tánon' tsi wastohronón:ke tiorhárhon Deerfield tkonwá:iats, tsi nón tioia'totarhé:'on.

Wahontenenhrón:ni' Kahnawa'kehró:non', tékeni tewen'niá:we' nihá:ti, ratsihénhstatsi tánon' o'serón:ni' wahonhtén:ti'; wathonnehsákha' ne iehwista'ékstha'.

Karí:wes wa'thontstikáwha' tsi nííó:re' iahón:newe' ne Deerfield. Akohsere'kehkó:wa 1704 shiohseró:ten.

Teiotenonhianfihton tsi ní tsi wahonterfi:io'. E:so' wahonfiheie'. Wahontkwé:ni' ne onkwehón:we, wahshakotiié:na' ótia'ke ne wahshakoti'shén:ni'. Ne' tñho nón shontakahá:wi tóka' sótsi' é:so' rá:ti enhonnfiheie' ne onkwehón:we, tenhsakotiia'taiestáhsi' né:ne kwáh rotiia'tahnfi:rions tánon kén' nithotiién:ha' rotisken'rakéhte' entehshakotiia'ténhawe', tánon' thó ní tsi enhsakonehiá:ron' tsi ní ne shakotiién'okón:'a, kháre' ó:nen enhóniake' onkwehón:we. E' thó ni tsi ótia'ke rotihseennaientá:'on ne tiohrén:sa, ken'tá:here', arísmen, tánon' o'seronni'kéha kahsenna'shón:'a; ne kí:ken raotihseenna'shón:'a ne shakotiié:na Kahnawá:ke shakotiiá:the'.

Wahatihwistaniiiohtá:ko' ononhsatokenhtfi:ke kahnia'sá:ke, karontá:ke wahatihwánerenke'. Wahonnenhsá:ren' é' thó ní tsi tontahonhtén:ti'. Kwáh fi:ken tsi rotiháhes tsi niió:re' enshón:newe'. Iohseratshá:ni é:so' wahatiiésha' tsi niioháhes, iohaháksen tsi rón:ne' tánon' wa'tkanien'kwataséhon'. Ne é:so' wahatiiésha' shotár, tsi thotikwi'tsháhere' niió:re' iehatihsinén:serons. Wahshakoti'nósha' ne onkwehón:we ne tsi tehonathwén:karonte' ok é:neken thihón:ne'. Wahonská:neke' ronónha ó:ni' ahotiién:take' ne kahwén:kare', tsi niió:re' tsi tehotihwishenhé:ion tsi rotiniotkawenhátie' ok ne onkwehón:we iah thé tewe'ne' tahotihwishenhé:ion.



Tonsahatitharónnion', ia'thotirihwaién:ta'se' tsi
enkonwaia'táta' ne iehwista'éksta'. Wahén:ron' ne
roiá:ner,

"Kén:'en kaniatarákta' entewaia'táta', kenkwité:ne
tentitewakóha'."

E' thó ki na'á:wen'ne'. Wahatiia'táta'.

Ia'káhewe' ne kenkwité:ne sahontenenhrón:ni' e'
thó nionsahón:ne' kaniatarákta' ne Champlain, sahonetáhko'
ne iehwista'éksta'. Ronatshennonihátie' tsi sahatíhewe'.
Kháre' ó:nen iahatihwistaniión:ten' ononhsatokenhtí:ke
kahnia'sá:ke. E:so' iohserá:ke wáhontste'.

Ohiarí:ha shiwennhni'tó:ten wísk-iawén:re'

shískare' tiohtoniawén:re' tewen'niáwe' tánon' iá:ia'k-
niwáhsen tióhton shiiohseró:ten kahwistasé'tsi sahati-
hwistannión:ten'. On:wa' wenhniserá:te' ononhsatokenhtí:ke
kanónhskon oshon'kará:ke tká:ien' ne Deerfield aohwísta'.
Ne tsakawehiahrakwén:nis tsi niiawén:'en ne iehwista-
'ékstha' aoká:ra'.

Warisó:se Kaieríthon



SENHA' TEHOTI:KA TSI NI:IOT NE AKON:WARA'

O:nen ki' kwáh ken' niiohserá:ke tsi náhe' kí:ken
 é' thó niiawén:'on. E' thó shikahá:wi' kontatewenní:io
 shé's ne katshé:nen' ne kahnawá:ke. Isi' nóhskwati
 she's niió:re' niekonnéhtha' ne teionnhónhskwaron.
 Awenhniserakwé:kon enkontihón:take' ná:kon ne kwá:ti.
 Sok she's tentkonhtén:ti' nó:nen ienkáhewe'
 akonwatinon'tatáhko' orhon'ké:ne tánon' ne ni'
 no'karahsnéha.

O:nen kí:ken shiwenhniserá:te' iáh tha'tetiawé:non
 kí:ken ne teionnhónhskwaron. Iahonwanató:ri' ne
 tehniksá:'a iatate'kén:'a aonsakonwaia'tisákha'.
 Iahniráthen' karíhstá:ke. Ia'thiatkathónnionhwe'. Tóka'
 akonwá:ken' ne raotitshé:nen' ka' ok nón:we
 aontaiora'kárhon'. Kháre' ó:nen ki' ionsahiátsnenhte'
 ísi' ne ká:ti' ákte'k nón:we ieshonatkén:se'. Kháre'
 ó:nen tó:ke niió:re' ná:kon ne ká:ti ia'thiatstikáhwaha'.
 Iáh ki' tekonwá:ken ne raotitshé:nen'.

O:nen tontaió:karahwe' tahiatáhsawen' tonthiate-
 rihstíta' tehotisterihenhátie' ase'kén ronaterién:tare'
 akón:wara' í:re's nó:nen entiokaráhwe'. Kí:ken ne
 thakowá:nen rattó:kas rotatshatará:nis ok thé:nen'
 okwirokónhson' nek tsi iáh wé:ne' tehaón:ni ase'kén
 tóhsa' ahoterónhkwen' ne rokén:'a. Kháre' ó:nen
 wahiastó:ron'. Sok ó:ni' ne onstoró:en ne kí:ken
 karhakónhs'on tetiotshatarátie's. Kháre' ó:nen
 wa'thiarahtáte' ó:nen ki' sénha' ákta' nonwéhte' ne
 notshá:ta'.

O:nen kí:ken ne thakowá:nen tahohterón:ne'.
 Wahanonhtónnionhwe' tsi tóka' ó:nen ki' ne akón:wara'
 shakoienáhsere'. E' thó ki' kí:ken ronahstoróntie' tsi
 nontaió'kara'onhátie'. E' thó ki' ne akón:wara'
 sénha' aktóntie' nontahawenonhtonhátie'. Kháre' ó:nen

thó:ha ahshakonhonterá:ne'. O:nen thó:ha shahia'nikonhró:ten'
waháttoke' ne thakowá:nen ken'k nñiío:re' ne karhá:kon
tkaháhserote' tontahonerahóntsha' ne ro'kén:'a tánon'
wa'thní:ten' tsi niiohsnó:re' iahianontátsnenhte'.
Iakén:'ak iahninhohó:kate' rotikstén:ha iatathróna' tsi
thnί:teron, raotinónhskon ia'thnhra'kwénhtara'ne'.
Wahonatewerá:ienhte' ne akón:wara' kwah iakén:'ak tonsa-
hshakowíhskwahte'. Seréka' ahshakoié:nenwake'.
Wahshakotihró:ri' ne iatathróna',

"Tsatera'swí:io kí:ken teseniiá:se, tsi iáh
tetshiseniié:nen ne akón:wara', ase'kén iáh hónhka' ne
wén:ton tetsako'niakén:'en tsi niiá:kon shakonhonterá:'on
tsi niiohserá:kon ahsontakónhson sha'tehotstika-
hwenhátie's."

Konwatsi'tsaién:ni

RONENHE:ION IAH TEHONTA:TI'

Wahón:nise' iá:ken' kaná:takon rati'terón:tahkwe'
kaié:ri nihá:ti ronón:kwe, tehontero'serfiohne'. Kháre'
ó:nen kí wa'thonterihotárhoke', iáhken ónhka'
ahohteron'níhake'. Shaiá:ta kí ne rahtahkón:ni'
wahaterá:ieste' tsi iáh thé:nen' tehatshá:nis. O:nen
ki' ne ronátia'ke ne rontén:ro' wahón:nehre' enhonwate-
'niéntenhste' oronhwí:io ken.

Sók kí shaiá:ta thahrón:ni tsi wahrenhé:ie'.
Shaiá:ta né:ne rahenheion'tahserón:nis wahshakaón:nien'
ne karón:to. Kwáh ki' tahatiié:rite' tsi wahonwaia'tá:-
ren' tánon' akwé:kon wahatiweienén:ta'ne' tsi niote-
rihwíson'.

O:nen kí tsi taió:karahwe akwé:kon ki' ne
rontén:ro' wahatinonha'á:na'. Wahonterihwahserón:ni' ne
kí ne rahtahkón:nis ne e' tenhárhente' enhatenón:na'.
Waharihwanón:wen' ne kí. Niá:rehkwe' ki' sahakóha'
raoio'ténhsera.

Tóhsa' ki' ahonónhtonke' tsi niwahsón:tes. O:nen
ki' kwáh ken' shikahá:wi' tsi niwahsón:tes kí:ken
rahtahkón:ni' renná:kahre' raonhá:'ak rone'kón:re',
roió'te' áhta shakwatákwás.

Thontaiawénhstsi' kí:ken ne raia'táhere' tahatá:ti'

wahén:ron',

"Hé tha'tesató:tat, thí:ken iáh teioterihwíson'
nahsenná:kahre' nó:nen senónhnha'."

Ne rahtahkón:nis wahén:ron',

"I:se' tha'tesató:tat, ase'kén iáh tehontá:tis
ne ronenhé:ion."

Sok ionsahatasónteren' sahoiód'ten'. O:nen kwáh
ken' niskahá:wi' á:re' ki ne raia'táhere' tahén:ron',

"Hé, iáhken tesá:ien' ahserihwakwénnienhste' ne
iakawenhé:ion. Tha'tesató:tat."

Ne rahtahkón:ni wahén:ron',

"Hé, énskak ó:nen enskonhró:ri', serihó:kten.
O:nen ní:se' senhé:ion."

Sok ionsahatasónteren', sahrenná:kahre' tánon'
sahane'kón:reke'. Sok á:re' ki' ne raia'táhere'
tontahohén:rehte',

"Serihó:kten thí:ken, tha'tesató:tat ó:nenk."

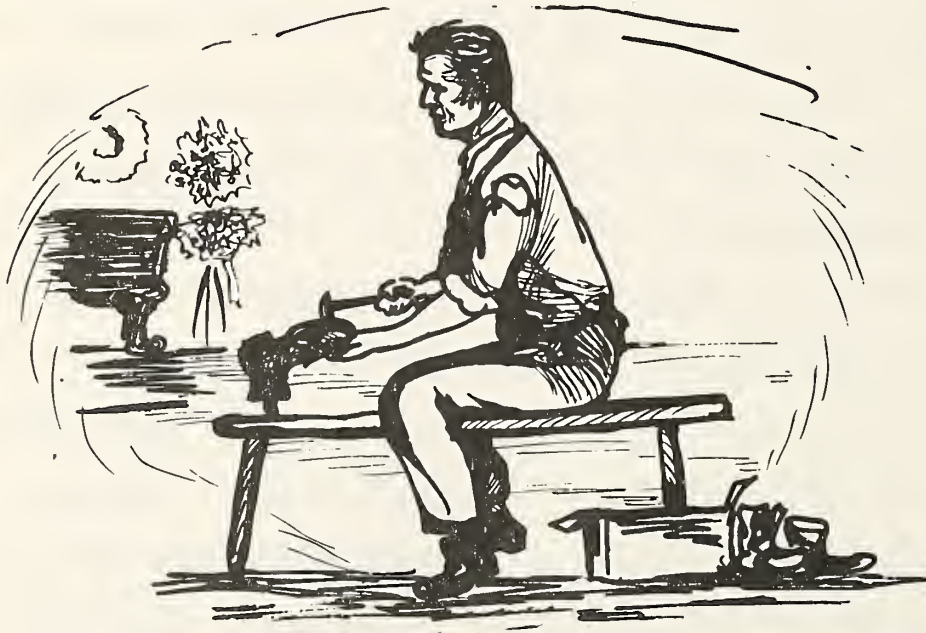
O:nen ki' ne rahtakón:nis tahoná:khwe'.

Tontahatá'stsi' tánon' karonto'tsherákta' nia'thá:ta'ne'
tánon' ia'thosó:kwe'ke' ne raia'táhere'. Tonsahat-
karhaté:ni', ionsahátien' tánon' sahoiód'ten' skén:ne'
tsi niió:re' wa'awén:te'ne'. Iah nénska tha'tetho-
wennaketó:ton' ne rawenhé:ion.

Tsi ó:nen tontahón:ne' ne rontén:ro'

aonsahonwá:iehte' ne raoniheión:ta' tánon'
aonsahshakokaratón:hahse' oh na'á:wen' tsi niwahsón:tes
iah tehotikwénion aonsahonwawiéhton'. Iah
tha'tiesehshakowennará:ni ne rawenhé:ion rontén:ro'

Konwatsi'tsaién:ni



ERHAR'O:KON

Wahón:nise' iá:ken' né:ne wa'tewatenón:ianihte'
érhar wa'kontinákeren'ne' ne kaná:takon. Tánon' she's
iá:ken' teionaterien'takária, ahsontakwekónhshon'
iotihní:hen. O:nen iá:ken' ne ranatakwe'ní:io' wahariho:-
wanahte' tsi entá:'on ok nenkaié:ren' kí:ken érhar sótsi'
wa'onatiohkwánha'ne'. Wahontkennísa' ne ronón:kwe,
tánon wahatirihwínion'te' tsi akwé:kon ki' entá:'on
enkonwanahshéhton'.

O:nen kí:ken rokstén:ha í:non karhá:kon thanákere',
iaharihwá:ronke' tsi nihontierá:ne'. Kwah iá:ken'
óksa'k tahahtén:ti', tahshakohróriá:na' tsi iah tetkaié:ri'
tsi nihontierá:ne'.

Wahshakohró:ri', wahén:ron', "Enkwahró:ri' tsi
ionkhiia'takéhnhas thí:ken érhar. Sewaterién:tare'
kí:ken kaniataratátie' tsi ohniare'kó:wa kontí:teron',
tánon' ne teionatonhwentió:ni ne aontakontiráthen'
kén:'en kaná:takon akóntien'. Ne ká:ti' thí:ken
ahsontakwé:kon sewathón:te' érhar iotihní:hen. Skonwa-
na'te'kwáhtha' ne ohniare'kó:wa, tóhsa' atíá:kta'
naontakón:ne'."

Tsi ó:nen waharihó:kten' ne rokstén:ha, iah ónhka'
thé:nen' tetiaká:wen tánon' skennen'áhson:'a sahonhtén:ti'.
Iáh ne wén:ton ónhka' tha'teskonwana'nikónhare' ne érhar.



Ne aorí:wa', shé:kon nón:wa' tho niionkwanahskwa-
ká:te' érhhar ne kaná:takon.

A:nen Kaia'titáhkhe'

KASPÉ

Né:ne wahón:nise' shé:kon askwakaión:ne
sha'teionskwí:ia'ks nón:kwe ó:nen iá:ken' kí:ken
tontahonahtentionhátie' ken' nithotii^ēn:sa skaniatará:ti
na'tontahón:ne'.

O:nen iá:ken' tahón:newe' tsi iotón:niate' ó:nen
wahónttoke' ó:ia' ohná:ken' tahón:ne'. Sok ná:'a
shaiá:ta wahén:ron',

"Há'o kén:tho tewatáhset, eniethiia'tetshahníhten'
thí:ken ohná:ken' tahón:ne'."

Thó kí nahatí:iere'.

Wahón:nise' iá:ken' thó nón:we nishonókwen
ronkwehkénha', Kaspé ronwá:iatskwe'. Thó kí' tsi
karíhstote' thonwaia'táten'.

O:nen kí' ne thó shiwahsontá:te' thó wahonteneró:-
kwaïen' wahonterhá:rate' ahón:newe' ne ronátia'ke tahón:ne'.
Kháre' ó:nen ki' khé' ákta' rotihtharonnóntie' ne kí:ken
ohná:ken' tahón:ne'.

O:nen kí' thók nitió:re', ó:nen enwá:ton'
enhsheién:tere'ne'. O:nen shaiá:ta ne rotahséhton
wa'thohén:rehte', wahén:ron',

"Tóhsa' ia'satkáhtho Kaspé tsi thaiá:ta."

Sok iá:ken' ki ronnón:kwe tahontihéntho' wahon-
té:ko'.

O:nen ki nen' né:'e ne kí:ken ratineró:kwaïen'
 wahónttoke' tsi niió:re' tsi ronateronhienhtén:ni,
 kí:ken ne ronón:kwe ronate'kwenhátié'. Sok ne ne:n
 né:'e tahontihéntho' wahonté:ko'. Ne's ká:ti'
 ionsahiatkáhtho'. Shé:kon ká:ti' ohná:ken' tá:re'
 ne Kaspé tahshakóhsere'.



Né:'e ká:ti' ne' né:'e tho ní:iot tsi
 wahshakotianerónhkwen' ne Kaspé ne thó shikahá:wi'.

Né:'e ki nen' né:'e ne wahón:nise' ne shé:kon
 shihatikaraweientehténion' ne khe'nihokón:'a séns thó
 ní:iot tsi ratiká:ratonhskwe'.

Né:'e ki nen' né:'e ne akwiratékha' ronwá:iatskwe'
 ne kí:ken rakkaratón:ni.

Akwirá:'es

O'TONHKWA'

Tóka' iá:ia'k-iawén:re' sha'tewakohseriiá:kon
teiontiatieronnión:ni istén:'a tánon' í:'i shonsaion-
tiahtetionhátienne' énska shiwahsontá:te'. O:nen ki'
kwáh·kén' shitio'kará:'on tánon' teiothahá:kton tsi
nón:we niiákene'. Ok tieió:ken' she's tsi tionkwa-
nónhsote' nó:nen kanenna'ké:ne tánon' akwé:kon
ionerahtén:'en. Kwáh she's ki' ken'k nón:we thí
tkahnhohká:ronte'.

Ionkenikaratóntie' ki' ná:'a, kháre' ó:nen ki
istén:'a ia'ontkáhtho' tsi tionkwanónhsote' tánon'
wa'í:ron',

"Oh nekén' kwah nón:wa' nithatiérha' thí:ken
ia'níha?"

O:nen ó:ni' ní:'i ia'katkáhtho'. Ken' niken'tónhkwa'
se'kén tsi tkahnhohká:ronte' skennen'ahsón:'a tsi
teiohkwatasehátie'. Kwáh né:ne ónhka'k shi ok nahó:ten'
tieken'eniónnions. Iáh ki' thé:nen' teiontianonhton-
niónhon', ase'kén tho roió'tékwe' thetén:re' ne
rake'níha. Tsi ó:nen ionsaiákenewe' wahonwari'wanón:-
tonhse' oh nihatiérhahkwe' ne átste. Wahén:ron' ne'
tsi iáh ne énska tiehoiakén:'en. Wa'akonekhé:ren',
nek tsi iáh ki' thé:nen' teiaká:wen.



Tsi wa'órhen'ne' wa'akorihó:ta'se' tsi
thononhwáktani'ne ronwa'níha, sok óksa'k wa'onhtén:ti'.
Tho wá:'enhte' tsi thonónhsote'. Sótsi wa'ako'nísko',
ok ná:'a shithawenhé:ion shiahá'onwe'. Saiakehiá:ra'ne'
oh nahó:ten' iontiatkáhthon, tánon' ó:nen ó:ni'
wa'ako'nikonhriaién:ta'ne' tsi wa'akohshónnion'se'
thí thó shiwahsontá:te'.

A:nen Kaia'titáhkhe'

IAKOTINENIOIA'KS

O:nen ki' nř:'i nakká:ra'. Wahón:nise'
 skahwatsř:ra onkwehón:we ronné'skwe', tiótkon rona-
 tonnháhere'. Kř:ken ne ronwa'nřha ratoratsheraweiénhen
 iáh nowén:ton tehontonhkária'ks ne raohwá:tsire'.
 Kř:ken ne shakoti'nistéňa ieweiennř:io iakokhonniáhtskon
 tánon' tiótkon ionhkwennión:ni raonawenhshón:'a kanéhon
 tánon' óhwhare' ióntstha', ne ó:ni iakonniá:tha' ne
 raonahsire'shón:'a.

Kaié:ri nihotiwř:raien'. Tseiá:ta ne řsi' nón
 niiako'nikonhratshá:ni, Katsi'tsaró:roks iontátiats.
 Ne kwáh iakaon'éskwani kaniatarákta' aióntien', tiótkon
 nia'té:kon ionnonhtonniónkwas ne karihwř:io's naontá:we'
 nakohwatsř:rakon.

Ia'a kó:ta'we' se'kén nón:wa'. Akoserénhtakon
 iakothón:te' rotíhthare'. Ia'eiéhtahkwe'. Taionnitskó:ten',
 kén' na'é:iere' ken' rón:ne' iakotineniódia'ks, kén'k
 nihón:na's iatathróna' tánon' áhsen nihotiwř:raien'.
 Kwáh se'kén kř:ken owirá:'a kahronhserá:ke roia'tanentá:kon.
 Katsi'tsaró:roks o'nistéňa iotká:te' ronwatikaratón:nis
 ne ronwatiien'okón:'a ne iakotineniódia'ks. "Tóhsa'
 ietshitshá:ni'k, ietshithárhas tóhsa'teietsheia'te-
 riahtřkhon enietshiaterá:shon'." Ne kati' wa'akehiá:ra'ne'
 tsi nahó:ten' iaká:wen o'nistéňa. Iáh ki'
 tetiakoton'nékon'.



Iahonwathihthárhahse' wa'í:ron', "Ká:ts kén
 sewátien tánon' sewatoríshen. Sewatonhkáia'ks kén?
 Kana'tarokhón:we tánon' sewahio;wane' wátien'. Kóh
 ísewak," tánon' wahonwathihné:kanonte'.
 Wa'í:ron', "Ka' nón nisewén:teron'?"

Wahní:ron' ne iatathróna', "A'é:ren ononto-
 hará:ke." Wahshakotihón:karon' aienatá:ra' tsi nón
 thatí:teron'. Wa'onthón:tate'. Sahón:ne' tsi
 sahonhtén:ti', iahón:newe' tsi tkentstén:rote'.
 Kí:ken iakonenioia'ks rahsnonhsá:ke wahonitskerón:ti'
 tánon' kentstenhrá:ke waharanie'. Thontaiawénhstsi
 kén' ní:wa' tsi wa'tewateronwén:tate'. Ionsahontáweia'te'
 raotinónhskon ne raohwá:tsire'.

Wa'i:ron', "Iáh tháonton' iakatáweia'te' sótsi' kén' niwá:'a tsi iontaweia'tákhwa'."

"Tó:ske' wáhi'," wahén:ron' ne iakonenióia'ks. "Sonke'nikónhrhen tsi skowá:nen nĩ:se'." Akohén:ton wa'thá:ta'ne' tánon' rahsnonhsá:ke wahnitskerón:ti', ienontsií:ne wahié:na'. Thontaiawénhstsi' wa'ónhstho'ne' tsi niió:re' tho ok nitsá:ka' tsi ni' ne ronátia'ke. O:nen ón:ton' ia'ontáweia'te'.

Kĩ:ken raotinónhskon ken'k nĩ:wa' atekhwá:ra, ani'tskwá:ra, kanakta'shón:'a kaké:ron', tánon' karihstote'. E' thó kana'tsáhere' karihsta:ke onón:tara'. Wa'ontathón:karon' Katsi'tsaró:roks tahón:tonte'. Wa'enontararónnion' ne iakón:kwe iakorákwen, iakorákwen, tánon' iáh tetewaterákwas nonón:tara'. Iotena'tsátkon'.

O:nen ia'káhewe' ne Katsi'tsaró:roks naonsa-ionhtén:ti', e' thó ionsaiontó:roke' tsi teionitstenhra-kháhsion. Khé' thó roia'ten'tón:ne ne rón:kwe kén' nihrá:'a, sahonitskerón:ti' rahsnonhsá:ke tánon' ienontsií:ne iahaié:na'. Thontaiawénhstsi saiontehiá:ron' tsi nitiá:kahskwe'. Wahén:ron' ne iakonenióia'ks, "Enhskerharátsten' tsi iáh ónhka' thahsehró:ri' tsi wahskwá:ken', tánon' tsi wahskwátho' tsi nón iakwén:teron'. " E:so' shé:kon saienatá:ra' tsi niwakénnhes.

Kanenna'ké:ne' ón:we', ia'káhewe' ne Katsi'tsa-ró:roks tánon' akohwá:tsire' iaonsahonhtén:ti' tsi nón thatoratstákhwa' ronwa'niha. Saienatá:ra' shé:kon nohna'kénkhka' tonsahonwatinonhwehrá:ton' nakoteró:sera'.

Kĩ:ken iakotineniódia'ks wahatkáththo' tsi tiakorihwaie:ri'. Wahén:ron', "Ne tsi seksa'tí:io tánon' iáh tesathró:ri tsi wahskwá:ken', ne kati' enkón:ion' áhsen niwaskanektsherá:ke."

Ne kĩ:ken tiotierénhton wa'erá:ko', "Kaská:neks ne iotena'tsátkon' ne onón:tara', né:ne akhwá:tsire' tóhsa' nowén:ton aiakwatónhkária'ke', tánon' ónhkha' iakotohetstonhátie' aiakhinontará:nonte'. Tekeníhaton, kaská:neks ne o'nikón:ra' ne tóhsa' nowén:ton ónhka' akhe'nikonhráksa'te' ne akarihón:ni' tsi nahó:ten' tkewenníneken's. Ahsénhaton, kaská:neks akwé:kon nón:kwe enkhé:ken' ne tiók nahó:ten' akatkáththo' ne ioiánere' tóhsa' akherihwa'tshénnia'se'."

Wahén:ron' ne iakotineniódia'ks, "Akwé ioiánere' nahó:ten' wahserá:ko', tsi nén:we' enhsónnheke' enhsatonnhá:rake', tánon' ensatera'swiióhake'."

Warisó:se Kaieríthon

TSI TETKAHNHOHONTION

Wahón:nise' iá:ken', atsá:кта' áкта' tkanonhsó:tahkwe'
é' thó rati'terón:tahkwe' iatathróna' tánon' ne
ronwatiio'okón:'a tánon' akokstén:ha.

O:nen iá:ken' kí:ken sewahsón:ta iahniiá:ken'ne'
ne iatathróna', wahiaterennaiénha'. Akokstén:ha
wa'ontenón:na'. O:nen ki' kwáh kén' shikahá:wi'
tahontáhsawen' ne ratiksa'okón:'a wa'thonterien'taká-
riahte'. Ronatsharokwáhton ki' ná:'a tánon' ieshonaterí:io,
ronatswá:ton tánon' ratitakhenóntie's. Kháre' ó:nen
wa'akononniá:ni' nakokstén:ha. Wa'aí:ron',

"Tha'tesewató:tat. Tóka' iáhten akón:wara'
ientsisewaia'ténhawe'."

Iáh ki' thé:nen'tehonatahonhsatá:ton. Kháre'
ó:nen thontaiawénhstsi' tahonwaniá:ra' ne shaiá:ta
ratákhe' ieia'tákta' shihotohetstonhátie'. Sok
wa'tiakonhohón:ti' tha'akón:ni' iahonwaia'tón:ti' átste'.
Nek tsi tsók nahó:ten' awenhsá:takon tahoié:na' tánon'
iahoia'ténhawe'. Iáh ne wén:ton teshonwaia'tatshénrion
ne raksá:'a.

Konwatsi'tsaién:ni

KANA'TAROKHON:WE

Nia'té:kon ne ó:nenhste' tsi ní tsi iakoia'takéhnhen
nokwehón:we, iakoia'tahní:rats tsi nííósheres. Kí:ken
oká:ra' ne tsi nííeiérhahkwe' aksótha nó:nen enienenhstó-
hare' tánon' eniethe'serón:ni' ohén:ton'tsi nííó:re'
kana'tarokhón:we eniena'tarísa'. Khwató:ken tsi ní tsi
roné:ka's nón:wa' tahonatehiaróntie'.

Kenkwité'stsi aksótha eniaé:ron', ó:nen ieíóhe
ahati'tarakarhátho'. Akwé tenhon'kenhrakwátho'.
ó:nen ienietáhkó' kahnenhshón:'a káksakon eniakéta'
tánon' entionkhí:ion' raktsí:'a khékén:'a tánon' í:'i,
enionkhihró:ri', "Kaié:ri tókani' wisk nikanénhstake
iensewá:senhte' áhsen niwahsí:take na'tekónteron'."

E' thó kí' na'kwá:iere', wakwahahoktaníhon',
raksótha tánon' aksótha ohná:ken'tá:ne' tahotírhohonhátie'
tsi nííó:re' eniakwáhsa'. Tsahíá:kshera sok ná:'a
eniotkè:tohte' kén' nikanerahté:son's tenkonta'kenhrótka'-
we'. E:so' tenkonwatíhsnie'ne' kháre' ó:nen enkon-
tehiá:ron' kwáh skenén:'a tsi enwatenenhstísa'.



Nó:nen kanenna'ké:ne ɛn:wawe' enhén:ron' raksótha,
 ó:nen iehiôhe naienenhstaienthó:ko'. Akwé tsi
 tkanenhstaiɛnthon ieniákwe' tánon' ieniakwahróhtenhte',
 e' thó ne ó:nen eniakwanoróhthsi'. Iáh akwé
 thaiakwanoróhthsi' kwáh nek tsi niió:re' iotenénhstate'.
 O:nen ki' nén' né:'e enwá:ton' aksótha tánon' raksótha
 enhniratskentón:ni', a'ɛ:ren nikaronhkwáhses tóka'
 tékeni-iawén:re' tókani' wisk-iawén:re' nikanonhkwén:take
 enhnihá:ren' naonstáthen'. Nó:nen akwé iostáthen
 nó:nenhste'sók nón:wa' entsakwanenhstarón:ko'.

O:nen enwá:ton' enienenhstohare'. Ken' niieiérha' tsi ienenhstóhares, enion'kenhrontá:ko' karístakon o'kén:ra né:ne ioté:ken wáhta'. Eniena'tsá:ren' karistá:ke ne ohné:kanos tánon' wa'kenhrontákwen. Nó:nen tentiohnekón:ti ienienenhstáweron teniohnekón:ti' tsi niió:re' nó:nenhste' enkontia'tawítahsión:ko'. Thó ne' ó:nen eniehrá:ko' karistá:ke. Tsi kahionwatátie' ieniéhawe' e' thó ienienenhstóhare'. Raksótha rona'tsakahrón:ton e thó ieniónweron' sok awén:ke ieniá:kohwe' kwáh skenén:'a teniekarhatenihon' ia'otiiakenhátie' ne kahnekáksen. Wakon'éskwani séns akheiatéró:roke' tekka:nere' iorihwanerá:kwa tsi niió:re' tsi ontenenhstóhare' kwáh otsí:nekwar neniá:wen'ne'. Akwé ne konnón:kwe séns kahiónwakon iekontinenhstóhares. Ne thó nón shontakahá:wi iáh ónhka' teiakoiéntahkwe' ohné:kanos ne kanónhskon.

Nó:nen wa'enenhstoharéhsi' sok nón;wa' entsestátha'te' nó:nen kwáh tokén:'en enwastáthen' tsi ní ne óhstien', ó:nen enwá:ton' naiethe'serón:ni'.

Raksótha shahahní:non' ne kathe'serón:nis tiotáhsawe' iakwaksa'okón:'a onkwaio'ténhsera on:ton' naiakwate'serón:ni'. Kí:ken kathe'serón:nis ká:tens oshón:kare' é' thó iora'nentá:kon tánon' iokahkwén:tonte', ieniakwanenstáweron' sók teniakwatenníha'te' teniakwakarhaté:ni' ne' okahkwén:ta', ná:kon tkaksó:ron é' thó ieiohná:ote' othé:sera' tsi niió:re' eniakwáhsa'.

O:nen kathe'serison' o:nen enwa:ton' eniena'taron:ni'.
 Ken' niieiérha'. Othe:sera', onekwénhtara' nikasahe'to:ten',
 tánon' ostón:ha tiohió:tsis, kaksakon eniakéta',
 teiohnekóntie's entiónweron', sok tenionwénrie' tsi
 niió:re' tenkontatié:na'. Ohnekanó:sne ia'tennionni-
 hsnónhsohwe'. Eniontokwatsherótsenhte' iehsnonhsá:ke
 enié:ren' tenietakwénhtenhste' tánon' teniehwe'nón:ni',
 tetiohnekóntie's ieniakéta'. Nó:nen enwatá:kerahwe',
 né kén:ton' tsi o:nen wa'ká:ri', le'wahrakeri'táhstha'
 tókani oskenón:ton enié:rihte' ne teniakwatatiéhsten'
 ne kana'tarokhón:we tánon' kén:ie entionkwá:ti'
 iawékon'. Ne sha'kanenhstaiakwátstha' nó:nen
 eniakwatátston' onénhsto.

Iáh the:nen'tekaiésa's nó:nen kanenhstaienthókwen.
 Kí:ken onó:ra' kaiarowá:nen ronnetáskwe', ratiksa'okón:'a
 thó rón:ratskwe', tánon' sèns ratiratsken'tón:nis
 kentskare' ionrahsi'tokewáhtha'. Kaia'tón:ni o:ni'
 rononniá:thahkwe'. Shé:kon nón:wa' shehiá:ra's akwe
 tsi niiakwahwatsí:ra' kató:ken nahó:ten' ionkwa-
 io'tensherá:ien'. Ion'wé:sen' she's ne' skáthne tsi
 ionkwaió'te',

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AHTHEN:NO

Wahón:nise's iá:ken' tahonhthénnokskwe' tewa'á:raton.
Thihonaterien'tatshénrion' tsi ronahthenno'tsherón:ni.
Né sé's iá:ken' thi tsikónhses kéntson enkonwaié:na'
tánon' enkonwania'tó:'ase'. Ohén:ton' tsi niió:re'
tenhatí:rihte' ka' nionhsákta' nón:we nenhatikwé:taren'
kwáh se's iá:ken' né:ne aiohnatirónhthake' kwáh se's
iá:ken' ó:ni' ostón:ha teiothwe'nón:ni ne éh nón:we.
Né ki' iá:ken' enhatikwé:taren'. Ne énhontste' ne
enhonhthenno'tsherón:nia'te'. Tho niió:re' ó:nen
onia'tará:'a tenhatihwawén:'eke'. Thók se's iá:ken'
ní:iot tsi ká:ien' ne wahón:nise' ne ahonten'nikonhró-
ria'te'. Né se's ki' iá:ken' róntstha' ne wahón:nise'
tsi tehonhthenno'óksthahkwe'.



Oróte' Karihwénhawe'

WAHSHAKOIA'TAKEHNHA' RAOHWA:TSIRE'

Ne' thó nón shontakahá:wi' .shé:kon í:non
sha'teionnonhsháteron' wahotiténh'ta'ne' ne onkwehón:we
ase'kén ne' thó shiiohserá:te' iáh é:so' teiokennó:ron
sok ná:'a ki iáhten' tehotihetiióhse' nahonnonnhéhkwen
ase'kén akwé:kon ieiénthohskwe'.

E'tho nón shontakahá:wi' akokstén:ha akaonhá:'a
ié:teron' iakothón:te' ónhka'k tiehnhonhtíshon. Ia'ont-
ke'tó:ten' e' thó raksá:'a íthrate'. Wahonwanhohtón-
kwahse' aontahatáweia'te' wa'í:ron',

"Takí:tenr na'teiiawenhniseranón:iani tánon'
saiakenhátie', serihsión:ko ne sawenhshón:'a tánon'
tstátha't."

Tahén:ron' ne raksá:'a, "Iah tháon:ton'
ase'kén tewakseríhens iaonsá:kewe', istén:'a ionkehn-
ha'onhátie'. Ahsathón:tate' ken aonsétene' ase'kén
ratikwé:kon thotinonhwáktani' ne onkwanónhskon.
Teiako'nikónhrhare' ne istén:'a ase'kén iah ó:nen
tetsonkwatennatsherá:ien' iáh ó:ni' tetsonkwanonhkwatshe-
ráien' tánon' é:so' tsi iakononhwáktani' ne istén:'a.
Wa'í:ron' tóka' ostón:ha aesanonhkwatsheraién:take'
tánon' aesakhwaién:take' ahshé:ni' aiontshennón:ni'."

Wa'í:ron' ne akokstén:ha,

"A:ke oh néntiere' ne iá:kewe', na'teiohahahnón:-
niani enkatonrió:kten' tsi na'teionien'kwatá:se'."



Tahén:ron' ne raksá:'a, "I:'i enkonía'thahónnien'." Thó ne wa'ontatkwatá:ko' tánon' sahonwáhsere' ne raksá:'a. Wa'akonehrá:ko' tsi niwatié:sen' tsi ní tsi í:ien' wa'ónt-toke' tsi akwáh né:ne tekaniehtohtárhon tsi nón:we ní:ien'.

Iahá:newe' tsi nón thotinóhnsote' ne raksá:'a, ia'ehn-hohtíshon. Ro'nisténha taiehnhohtón:ko' wa'í:ron',

"A:ke tasatáweia't! Niwenhniseráksen saiakenhátie'."

Taiaí:ron' ne akokstén:ha, "Ehtién:'a kwí' ietsehn-há:'on ahakihnónksha'."

Wa'í:ron' ne ro'nisténha, "Iáh ónhka' tiekhehnhá:'on ase'kén akwé:kon é:so' tsi ionkwanonhwáktani'. Ahsen nón:ta' tsi náhe' wahshakwaia'táta' ne Ohserá:se'."

Wa'í:ron' ne akokstén:ha, "Oh kati' na'á:wen' tsi né:'e rakihtonksónhne'?"

Rake'níha rakkaratón:ni

Niironhiá:'a

SE'NIKON:RARAK

Tóhka' niiohserá:ke tsi náhe' éh nikiawén:'en
kí:ken kkaratón:ne'.

Ake'nisténha ɔ:nen kwáh kén' náhe' ionkkaratón:ni.
Kanátthen ne tsi kaná:taien' ia'teiahahahahiia'kon-
hákie'. Tha'kaké:rok iá:ken' ísi' na'oháhati
iakothón:te' ónhka'k khe thontahohén:rehte',

"Se'nikón:rarak wats ensákwahte' thí ká:sere ."
Tánon' iá:ken' tontahohahahahiia'konhákie'. Tsi
wa'thiátera'ne' ne ake'nisténha wa'é:ron',

"Iáh ki' ne ónhte' **thé thaesewatkarón:ni.**"

O:nen iá:ken' kwáh kén' niió:re' sá:re'
tontahohén:rehte' iá:ken' tánon' wahén:ron',

"Ká:sere ki' wáhe' enkarihwén:ta'ne'."

Oróte' Karihwénhawe'

ATERO:SERA'

Ne iá:ken' kí:ken tehnón:kwe, shiá:ta Ahkwesahs-hró:non' tánon' shaiá:ta Kahnawa'kehró:non' nes ne ronaté:n:ro' nek tsi teiotenonhianíhton tsi na'tehiatate-rihwanonhwéhne'. Tiótkon ok nahó:ten' tiorihón:ni tehonatkénnion.

Tetsá:ron rotinahskwaién:tahkwe' érhár, tánon' tiótkon she's ó:ni'né:'e tehotirihwatí:ronte', ónhka' raotshé:nen' sénha'ra'shátste'. Kháre' ó:nen wahiaterí:io' ne raotitshé:nen' érhár. Sok wa'thní:ien', kwáh wahnihwistá:ren'. Ó:nen ki enkató:ken'ne' oñhka' raotshé:nen' sénha'ra'shátste'.

Kwáh iá:ken' nek ne na'tewaniwharó:ko' tsi wa'-thiatátienhte' ki érhár. Kwáh iáh thé:nen' tetiό:ken' ka' niká:ien' rotkwenionhátie'. Kháre' ki' ó:nen ia'tonson'kenhraién:ta'ne'. Kwáh iá:ken' nek ne otáhshon'o'kenhrá:ke skaké:ron'. Óksa'k ki' ã:re' ne ronaté:n:ro' tonsahiatkén:ni' ka' niká:ien' sénha'í:ions tiotaté:n:ron.

A:nen Kia'titáhkhe'



RABAHBOT

Tóhka' niiohserá:ke tsi náhe' sha'té:kon nikón:ti rabahbót wahentsiahní:non' ki rake'níha. Atsiá:kta' iah-shakó'teron' tsi nón:we iáh akwáh tekiohnó:tes.

Tsiahiá:kshera tó:wa' entóhetste' kí:ken rakenonhá:'a eh tahahrárho'. Ronehrakó:'on iá:ken' kí:ken tsi nikanahskwí:io's ki kéntsion. Tánon' ki' ne sénha' ieshonehrakó:'on tsi kwáh akwé:kon skáthne tsi nón:we nikontí:teron'. Ok ó:ni' iá:ken' ná:'a iahohrión:ti' akwé:kon wahshakoié:na' ki rabahbót. Sha'té:kon nikón:ti wahó:nawe'. Kwáh iá:ken' khé saháhkete' kí:ken rakenonhá:'a sahentsiahsheronniá:na'.

Ionsá:rawe' ki' óksa'k wahentsiahsherón:ni' tánon' wahentsiakerí:tahwe'. Tsi nahotsiaríhse' ki' kí:ken wahén:ron', "To ionkiatén:ro' rinontsianontén:ra."

Otsta' iá:ken' ne' tsi nontahatshennón:ni' kí:ken rake'níha. O:nen iá:ken' tó:ske' tsi rotikhwáten' wahori'wanón:tonhse' ne ronatén:ro', "Ka'," wahén:ron' "nón:we nontahsitsiénhawe'?"

"Kí:ken rakenonhá:'a wahén:ron, "Satsiá:kta' orhon'kéhstsi' takhráho'. Tsi ki' nón:we thí:ken iah wí' sótsi' teiohnó:tes. Tho iahonkwahrión:ti' wa'kahrióhkawi'ne'. Thó," wahén:ron' "ní:iot tsi kontí:teron' tó:wa' shí:ken hónhka'k eh konwatí'teron' rotenahskwarákwen."



Wa'thohén:rehte' iá:ken' kí:ken rake'níha tánon'
wahoiéshon'. "I:'i, wahén:ron', "thí:ken akitshenen'-
ó:kon. Tsiahiá:kshera tsi náhe' thó tekhé'teron'.
I:'i wakatenahskwarákwen."

Oróte' Karihwénhawe'

RAKSOTHA RAOKA:RA'

Wahón:nise', Ahkwesáhsne iá:ken', éh nitiawén:'en
kí:ken nahó:ten' kkaratón:ne'. Akohserá:ke éh niiawén:'en.

Arok shiiothétston ne "Seaway" kawehnó:ton' she's
thi ná:kon nekwá, kén' nikawehnohkwa:sa's. Raksótha
raowenhkénha' énska kén' nikawehnóhkwa'. Kanonhsó:tahkwe'
iá:ken', tekaron'ta'serónnion', tánon' thó she's nón:we
na'tehatí:ta'skwe' ne tehonatstekawhenhátie'. Sewatié:ren
tóhka' nón:ta', sewatié:ren nek ne sewahsón:ta
enhonnón:wete'.

Iatathróna' iahá:newe' o'karahsnéha', iatonhkariá:khe'
tánon' tehotihwihshenhé:ion. Oksa'k ne rón:kwe
wahatsenhón:ni', tánon' ne iakón:kwe taiontáhsawen'
wa'ekhón:ni'.

O:nen ki' shishonahtá:'on, wá:rehre' ne rón:kwe
óksa'k ki' ná:'a ne' ienharáthen', enhotá:wha'. Ok ne
iakón:kwe, khé:ken ne' tonsaiakohtárho' niá:re'. Kwáh
ki' thí:ken kén' nikarí:wes ó:nen tiok nahó:ten'k
wa'akothón:te'ne'. Wa'akorihwaióha' oh nekén' kwah
nahó:ten', sok ia'eiá:ken'ne', ia'tiontkahthonniónhwe'.
Iáh ki' thé:nen' teiakotkáhthon . Tontaiontáweia'te'
Sok á:re' saiakothón:te'ne', kwáh né:ne tiok na'ka-
ia'tó:ten' shitaio'tská:honke'. O:nen se'kén wa'ako-
'nikonhraién:ta'ne' tsi kanonhsohará:ke nontaiawenonhátie'.

Skennen'ahsón:'a tsi ia'ieráthen', thó iá:ken' ki
 "ráhskahn" tho'wahrá:kon ne ron'kénha'. Kwáh iá:ken' khe
 na'tontaieiá:ten'ne' tsi nikanekó:tes tsi niió:re'
 tsi wa'akoteronhiénhten', sok wa'tionráhtate' wa'onté:ko'.
 Owisa'kéhson' nia'etákhe', shakóhsere' ne "ráhskahn."
 Kwáh ki', iá:ken', ó:nen thóha ahshakohóntera'ne ó:nen
 wa'ónhsá:kaienhte'. Kaná:takon niió:re' iahonathón:te'ne',
 sok tontahshakonaterahtá:na'.



Saháhkete' ki' ne "ráhskahn", kwah iá:ken' nek
 ne wahén:ron' "Wesani'taní:tenre' tsi iáh tekonié:na."

A:nen Kaia'titáhkhe'

OTHE:SERA

Kí:ken kkaratón:ne' rakenonhá:'a rakkaratón:ni
tsi na'thokerón:nion'se'. Tsi niwakénnhes kí:ken
tho nihoia'tawén:'en.

"Orhon'kéhstsi'," wahén:ron', "wa'katkétsko'
ia'kiá:ken'ne' wá:kehre' enkhehnekanontén:ra' kí:ken
ohén:ton' tewakti'tsaiénthon. Kwáh," wahén:ron', "ó:nen
iewakhnekonkiéhsere' wa'káttoke' tsi ok na'kaia'tó:ten'
í:waks kí:ken tsi wakti'tsaiénthóhseron. Oksa'k ó:ni'
wa'káttoke' tsi tsiki'nhontstókhi' wahonwahehtaká:ri'."
Kwáh iá:ken' skanó:ronks ahontekhwí:sa' kí:ken rotsi'-
tsiaiénthon.

Isi' na'ohahá:ti rén:teron' ronatén:ro' wahohró:ri',
"Thí:ken ohnenna'tá:ke ronathe'serónkie's ne tho sá:ti."

Tho ki' iá:ken' nahá:iere'. Orhon'ké:ne iá:ken'
ionsahatke'tó:ten' kwáh iá:ken' ronatenekó:tote' kí:ken
tsiki'nhontstókhi'. Nek iá:ken' kí:ken rakenonhá:'a ne
shotakiehsón:ton só:tsi' iá:ken' wa'thonwaren'ké:ni'.



Oróte' Karihwénhawe'

RONTONHWENTSI:SAKS

Kí:ken oká:ra' né:ne tóske' kwáh é' thó niiawén:'en.
 Raksótha ne kwáh é' thó nihoia'tawén:'en. 1893
 shiohseró:ten wahonwahtíhnha'ne' ne Hudson Bay Company,
 raksótha tánon' áhsen nihotate'kén:shen' nahón:ne'
 tehniíáhse nirihstí:sere's, nahshakotihahónnien' tánon'
 ahshakotihsnien:ne' nahatirihstí:sere' kí:ken onhwéntsase'
 Othoré:ke nón:we niiawén:'en. Raksótha Rówí Sohé:rased'
 ronwáiatkwe' tánon' Sakó, Wíshe, tánon' Kanenrahtí:ron
 ronwatíiatkwe' ne rontate'ken'okón:'a.

Kenkwitéhstsi'wahonhtén:ti' wahontonhwentsisákha',
 tióhton niwenhni:take karhakonhkó:wa rón:ne's, oná:ke
 tánon' érhár iotikarenionhátié' ne raonawenshón:'a.
 O:nen sha'tontahonahtentionhátié' nia'fe:kon tsi
 nahotiia'tawénhseron', Great Slave Lake konwá:iats, tsi
 nón seréka'tahonatenonhianihtén:ni'.

O:nen akohserá:ke ón:we'ioweiennatshá:ni tsi
 na'tkanien'kwatasehon' iáh thietsó:ken', wahontia'táhton'.
 O:nen ni'wahoná:karahwe', wahontenaktón:ni'. Tsi
 wa'óhrene' akwé raona'tóhsera' óniehte' tioterhó:ron,
 soronhké:ne ón:ton'tahatiiá:ken'ne' tánon' ne
 raotitshé:nen' érhár wa'kontia'táhton'. Raonatenná:tshera'
 ó:nen ehtá:ke ní:we' kháre' ó:nen iahóntshahte'. Tóhka'



nón:ta óniehte khók rononnhehkwen. Skenén:'a ó:nen
sénha' tsi rón:ne', rontonhkáia'ks, ratiwístos, tánon'
tehotihwishenhé:ion. O:nen ni tóske' tsi tehoti'nikonhra-
hri:'on.

Ia'thotirihwaién:ta'se' tsi enhati'wahstará:ko'
ónhka' tsi rónnhe' enhatatká'we', enhón:neke' tsi
rónnhe' ne tóhsa' ahonníheie', oh naiá:wen'ne' ronátia'ke
ahonnónnheke'. Né:ne kwáh ken' niehrá:'a tsi
nihontate'kén:'a Sakó, waha'wastará:ko' ne kén'
nika'wastésha. Kwáh í:ken tsi roti'nikonhráksens
tánon' tehoti'nikonhrahri:'on, tsi wahoná:karahwe'.
Tehniiáhse iatate'kén:'a ia'thotirihwaién:ta'se'
énska shé:kon enshiate'nién:ten' nahiatorátha'
oskenón:ton. Tsi í:ne' tahonahsí:tia'ke' wahkwari'tará:ken

raia'tá:ke, wa'thá:ta'ne' kí:ken ohkwá:ri tekeniawén:re'
niwahsí:take nihahnén:ies, wa'thatskára'we', kwáh né:ne
o'tónhkwa' ne rahsá:kon. Tóhka' nia'káienhte' nahonwa-
rón:tate' tsi niió:re' iahrénheie'. Oksa'k sahiathroriá:-
na' tsi wa'konwário' óhkwa:ri. Ronatshennonnihá:tie' tsi
wahoti'waraién:ta'ne'. Iah ó:nen ne Sakó thahrénheie'.

Sakonwaia'tisákha' ne ohkwá:ri sakonwaia'taióha',
sok ná:'a akwé tioteniehtó:ron wahnón'kwate' iá'h
tehotitshénrion ase'kén tioia'tataríhen ne ohkwá:ri
wa'kahwistaná:wen' ne óniehte' kaia'tó:kon. Tewenhniserá:ke
ronnókwats ó:nen shihon'nikonhróktha' ó:nen sakonwahiatats-
hén:ri' ne ohkwá:ri. Wa'konwaiénsehre' sok wahati'wararíhte'.
Tewenhniserá:ke ohnekákeri khok wahatihnekí:ra' thó
ne ó:nen wahati'wá:rake', akwé wahotinonhwákten' sótsi'
io'wahráresen' tánon' sótsi'karí:wes tsi náhe'
tethonatská:honhkwe'. Kanenrahtí:ron rahiakwirá:ke
wakanennió:kwano'ste'. Iah téshre's, ó:nen ni wahón:newe'
ne shakotiia'tí:saks nahonwatiia'takéhnha'.

Ionsahonwatiia'ténhawe' tsi nón thonatenatíson' ne
Hudson Bay Company. Kaié:ri nihá:ti iosnó:re'
sahón:newe' tsi nón ienakerénion'nón:kwe. Raksótha
Rowi Shohé:rased', ro'kén:'a Sakó, tánon' ne tehniíáhse
niristí:sere's, sok ne Wíshe, tánon' Kanenrahtí:ron, khe
íthne's sótsi' rotinonhwáktani'. Wa'thonwatíhshnie' ne
kwáh skenén:'a sahiata'karí:tate'. Kanenrahtí:ron,
seréka tsi rónnhe' ia'taioné:non'tetsá:ron
wahnwahsí:nia'ke'.

E:so' wahatiiésha'tsi ronahtentiôn:ne', tiótkon
 ki iahatirihwaié:rite' tsi nahó:ten' ronathonkaiá:kon.
 Kí:ken ne tionathonwí:sen'rotiniákhon onónha' ó:ni'
 wa'kontiiésha'. Ronaterihwasherón:ni né:ne Hudson Bay
 Company tsi rotiniákhon enkonwaticária'kse' tsi
 nikarí:wes othoré:ke iehón:nes. Kí:ken ne Hudson Bay
 Company ó:nen kwáh kén' náhe' iáh thé:nen tehshonwati-
 wennahrónkha' wahonte'nikonhrí:sa' tsi iáh tha'onsakonwati-
 kária'kse' ne rotiniákhon, wahonní:ron' iáh ó:nen
 tha'onshakwakária'kse' "ase'kén iákwehre' thonenhé:ion."
 Taioti'nikón:renne' tsi na'teiotenonhianíhton nahó:ten'
 wa'konwatihró:ri'. Oh nenkontiie:re'. O:nen wa'onatiá'kse'
 tsi kontihwistatáhkwas, akwé nieiotiwiraién:ton
 taiakotíhsnie'ne'. Aksótha áhsen niiakowiraién:tahkwe'
 istén:'a shiiewirá:'a. Kon'tátie' iakoió'te' tánon'
 to:k nitio'kará:on otsinéhtara iakoió'te' ská:ti ne
 ionhsitá:ke teiontatkarén:ron owirá:'a. Tsi nahó:ten'
 eniéhsa' kaio'ténhshera' teniontá:ton', atenná:tshera'
 tánon' ne karístakon nahó:ten' aionté:kate'
 nahotiia'tatarí:hen, iakén:'ak tsi ronnónnhe'.

Ontsharó:ko' tsi ó:nen sá:newe' ne iatatekén:'a,
 akwé ne rontátenonhkwe' tánon' ronatenra'shón:'a
 ronats Hennón:ni ronatonnháhere' tsi sá:newe' ne
 iatonhwentsí:saks.

Warisó:se Kaieríthon

TSITHA

Ne iá:ken' kí:ken ranekénhteron ionsahatáweia'te'
tsi thonónhsote' wajori'wanón:tonhse' ne ro'níha
aón:ton' ken ne aho'seréhtani'. "I:kehre' akaterohrókha'
kí:ken teioia'aks."

Wahén:ron' iá:ken' ne ro'níha, "Wá:s nek ki'
ná:'a ne enhsaten'nikón:raren'. Tóhsa'," wahén:ron',
"nón:wa' enhse'niakenhtánion'."

Sahén:ron' iá:ken' kí:ken ranekénhteron'
"Enkaten'nikón:raren'se'."

Orhon'ké:ne iá:ken' saharihwá:ronke' ne ro'níha
áktek nón:we iehshohonwí:sere's tánon' áktek ó:ni'
nón:we ronwá:kens tethoke'tóhton. Ohstón:ha iá:ken'
ó:ni' tsi ní:iot nahorihwáksha'se' ne ro'níha. Thók
shé' ní:iot tsi ronaterihwahsherón:ni tsi thók nón:we
ienhakwátho' kí:ken teioia'a'áksne. Iáh ó:ni' óksa'k
thé tehá:wen ki ro'níha. Tóhkara' nón:ta' ontóhetste'.

Ronwaia'tanontaktónhne o'karahsnéha shonsá:rawe'
ne roién:'a sahor'i'wanón:tonhse' ne ro'níha enhathón:-
tate' ken shé:kon ne aonsaho'seréhtani'.

Tho ki' nííó:re' ó:nen wajori'wanón:tonhse' ne
roién:'a tó:ske' ken ki oh nahó:ten' rarihwahrónkha'.

Wahén:ron' iá:ken' ki roién:'a, "Tó:ka'."

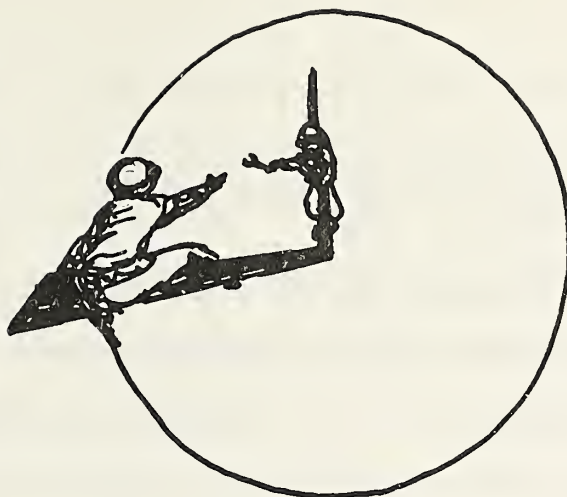
Sahén:ron' ne ro'níha, "Wa'kerihwá:ronke' thĩ
tóhka' niwahsontá:te' tsi náhe' kon'serehtanihén:ne'
tsi sa'niaken'én:ne',akté:shon iá:ken' nón:we
nonkwehshón:'a iesá:ken's tetisake'tóhton'."

Wahén:ron' iá:ken' kí:ken roién:'a ónhka' ne'
ne rá:ton. Ranonhtonniómkwas iá:ken' kí:ken ro'níha
tho niió:re' ó:nen iahén:ron', "Tsítha wahakhró:ri'."



Ia'tehononhsonhtiia'konhátie' iá:ken' ki roién:'a kwáh
ó:nen ranhotón:ne wahén:ron', "Ronó:wen kí'."

Oróte' Karihwénhawe'



KA:R NAHSONTHEN

Ká'tsi ok nón:we kí:ken kanón:no karĩhstatsi
thotiió'tehkwe' tóhka' nihá:ti kahnawakehró:non' tánon'
shaiá:ta ne ahkwesahshró:non' ostón:ha tethoná:kara's.
Shaiá:ta ó:ni' iá:ken' ne rahón:tsi skáthne
thonatoróhon ronkwé:tase'.

Ne ki' kí:ken ahkwesahshró:non' thé:nen' ki' ná:'a
iahorí'wanón:tonhse' aontáhó:ion' ne rahón:tsi. Sok
iá:ken' wahén:ron' tó:k na'tehawennakará:ni,

"Niá:wen ki' ahsónthen."

Khe' ki' niiohsnó:re' wa'tharihwaserá:ko' ne
rahón:tsi,

"Iáh tekará:wa', ákta' ki'k ní:se' ne ká:r
nahsónthen nihsia'tó:ten."

Konwatsi'tsaién:ni

TSIK A TSIK, TSIK A TSIK

Tsi niióhseres, iá:ken', kí:ken iatathróna'
wahiatonhkária'ke', tánon' wahiatienhtó:kten' ó:ni'.
Wahatateweiennén:ta'ne' ne rón:kwe ahatorátha', tánon'
wahshakohró:ri' ne ró:ne' tóhsa' aionté:ka'te' tsik
énsdrawe'.

Iáh teiakotahonhsatá:ton, kaní:io'k iahaiá:ken'ne'
sok wa'etsenhón:ni' tánon' sótsi' ákta' niahá:'en' tsi
iotékha' wa'onnihsnonhsótshi'. Wa'tiakohén:rehte'
ki' ná:'a tánon' wa'ako'tsí:reke' ne iehsnonhsá:ke.
Tsi niió:re' tsi iontonhkária'ks, wa'akawé:ka'we'
sekén ne iehsnonhsá:ke tánon' wá:'eke', wá:'eke' ó:ni'
ne ienentshá:ke, tánon' ne ieia'tá:ke, tánon' ne
iehsiná:ke, akwé:kon ne ionhsi'tá:ke. Kwáh iá:ken'
wa'ako'tsirékhon' ne ionhiakwirá:ke.

O:nen ki' iá:ken' kwáh iah thé:nen' tetsako'wá:rare',
tánon' shé:kon niiontonhkária'ks. Sok ia'eiá:ken'ne'
wahonwaia'tisákha' ne ró:ne'. Ne sekén ne ó:ia'
nikawennó:ten tsi wa'onhtén:ti'. Tsi ní:iot ne
wa'ohstien'tá:kahre', "tsik a tsik, tsik a tsik, tsik a
tsik."

Wa'tharáhtate' iá:ken'ne' raotshé:nen' érhar
wahohroriá:na' tsi na'akoiá:tawen' ne ró:ne'. Tánon'
ó:nen ó:ni' iahothón:te'ne' "tsik a tsik, tsik a tsik,

tsik a tsik," taiohstien'takaré:re', sok iá:ken' wahaté:ko'.

Iahá:rawe' kí:ken tekana'tkarokenhkó:wa
tánon' khé ieiotiá:kton. O:nen kí:ken
wá:rehre' oh nenhá:iere' ne tahiá:ia'ke'. O:nen ó:ni'
wahatkáthto' ken' nikanónhsa' tkanónhsote'. Tho niahá:re'
tánon' iahahnhonhtíshon'.

Tahahnhotón:ko' rokstén:ha' ken'k nihahnén:ies.
Wahori'wanón:tonhse' ne rón:kwe ahoié:nawa'se' tahiá:ia'ke'.

Wahén:ron' ne rokstén:ha, "Thi kawenní:io', entá:'on
ki' niáhkwe' enhsahiákha' tánon' enhsanitsatorátha'
tánon' kén:'en nentéhshawe'."

Tho ki' nahá:iere' ne rón:kwe. Wa'thosteríhen'
ki' ná:'a, ó:nen she'á:re' sahothón:te'ne', "tsik a tsik,
tsik a tsik, tsik a tsik," taiohstien'takaré:re'.
Tahó:ion' ne káhi, tánon' ne kéntson, sok ne rokstén:ha
wa'tatia'karatirón:ten' tánon' wahatatia'tahní:rate',
sok raia'tá:ke wahahtén:ti' ne rón:kwe wa'thaiá:ia'ke'.
Iahá:rawe' ki' ne ísi' nekwá ne rón:kwe, ok ná:'a ne
rokstén:ha sahatatáhsthohte', tánon' kanónhskon nionsá:re'.

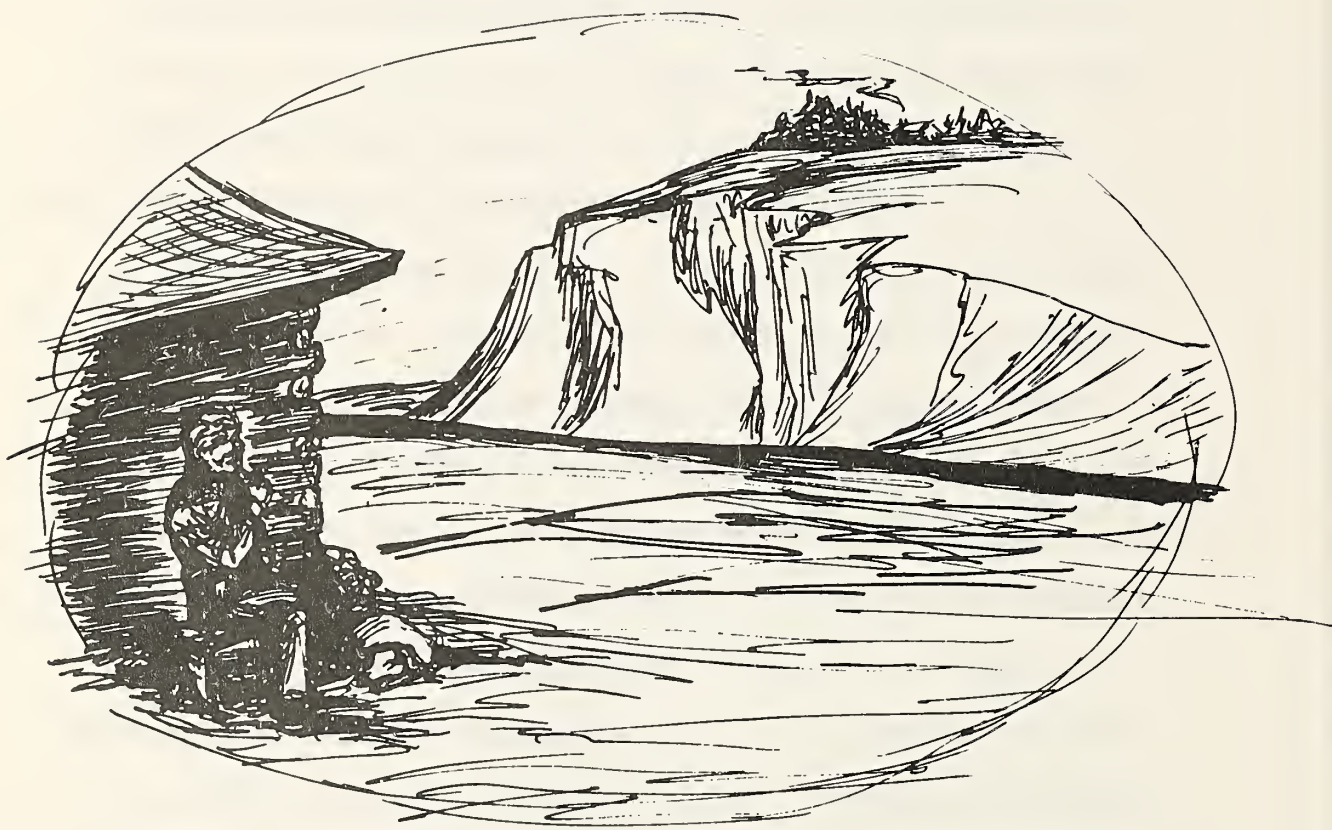
Ken'k nikarí:wes kanónhskon iéshre's, sok
wahothon:te'ne', "tsik a tsik a tsik a tsik." Aktóntie'
nontaiawenonhátie'. Kháre' ó:nen kwáh átste tho
taiorá:kahre'. Iahahnhotón:ko'. Thó í:tsete' kí:ken
iakón:kwe iah thé:nen' teiako'wá:rare'.

Wa'í:ron', "Taki'terónhna' ísi' nekwá."

Wahén:ron' ne rokstén:ha, "Thí kawenní:io', entá:'on
ki' niáhkwe' enhsahiákha' tánon' enhsanitsatorátha'
tánon' kén:'en nentéhshawe'."

Iah teiakothontá:ton, wa'í:ron', "Iah tewakenáktote',
kwáh óksa'k taki'terónhna'."

Sok ki' ne rokstén:ha wa'thatia'karatirón:ten'
tánon' raia'tá:ke wa'onhtén:ti' ne iakón:kwe, nek tsi
iah tieiá:ko ne ísi' nekwá, sótsi' wahatatia'tahnhétskwahte',
wa'ekháhen', tánon' ia'eiá:ten'ne'. Iáh ne wén:ton
ónhka' teskonwawennahrón:ken.



Shatatáhsthohte' ne rokstén:ha tánon' kanónhskon
nionsá:re'

A:nen Kaia'titáhkhe'

IAH TEHOTEWEN:NARA

Iekaratónhkhwa' tsi kí:ken kén' nithoión:ha
onkwehón:we raon'eskwaníhahkwe' iotahsontatíhen shé:kon
ahoiakenhatié:seke' tsi ní:kon ienhaiá:ken'ne'
eniaí:ron' ne ro'nisténha,

"Tóhsa' sasa'nikónhrhen ohén:ton' ne ahsónthen
tontasahtén:ti' ase'kén nó:nen enwatóhetste' ne' thó
nitsohwistá:'e nek ne iáh tekón'tkonhserí:io teskón:ne's."

Tiaṭewahsón:take ne kén' nithoión:ha enharhá:ratste'
tsi iosnó:re' énsdrawe' nek ki' tsi tiótkon
sho'nikónhrhens iahatkáthto' to nitsohwistá:'e nó:nen
ne rontenro'shón:'a tánon' raotihwá:tsire' enthon-
táhsawen' kakarí:io's tahontatkaratón:haḥse' iotká:te
iotkarátteron's.

Kí:ken wahsontá:te iahatkáthto' karahkwakaíón:tha'.
Tontahani'tsónhkwahkwe' ionsahaiakenhstahkwe' ase'ken
ó:nen tékeni tetsohwistá:'e. Iohsontáskats
ashon'thénhka' ioráhkote' iáh othé:non tehoḥteron'ní:sere'.
Onhka'k wahshakó:ken' taiakawenonhátie' tsi niahawenonhátie'.
Tsi ó:nen ákta'wá:'onwe' tsakothonwí:sen' wa'í:ron,

"Kwé, iohsontáskats wáhi'. Ka' wáhse'?"

"Sonkwahtentionhátie'," tahén:ron'.

"Niiohsontáskats, ánio ostón:ha tiahtén:ti,"

wa'kén:ron'.

"A:ke, iáh tháon:ton', ase'kén sók ná:'a ohná:ken'
í:ke' tsi ronkwahtentionhátié'," tahén:ron'.

Takén:ron' ne tsothonwí:sen', "Enskon'terónhna'."

Skáthne í:ne' tsi ó:nen iahá:newe' ate'én:rakon
wa'kén:ron',

"Anio tsi iakennekeraientákhkwa' ietiátien'
tánon' enteniká:raton'. Iáhse' thaiesaná:khwahse'
ase'kén ó:nense' tsí:sa."

Iahiatáweia'te', kanekótote' ontkáthto', wa'kén:ron',
"Anio ieteniráthen a' káts í:se' íshent," nek ki'
tsi ne ranekénhteron' wahén:ron',

"I:se' íshent," sók ki tontáhsawen' akaráthen'.
Sha'tekane kotí:hen sháhe' ó:nen teka'nhiá:ronhwe' iahaié:na'
wahathon'kwáweron' ó:nen wahatkáthto' tsi iáh tha'te-
wahsí:tonte' teiotshinarén:tonte', tsi niió:re' tsi
wahoteronhiénhten' takaiakén:seron' ne raoká:ra' tánon'
tehohenrehtá:ne' raotinónhskon nionsahatákhe'. Iowen-
natshá:ni wá:ton,

"Wesatera'swí:iohste' tsi iáhten í:se' tesahén:ton,
ase'kén tóka' aesahén:ton' iaonsakonia'ténha' tsi
nén:we'."

Shé:kon na'tehohenréhtha' wahonwaié:na' ne
ro'nisténha tánon' wa'í:ron',



"E:so' ó:nen konhró:ri tsi iáh tekontkonhserí:io
tiótkon ionatahsetonhátie's nahsonthenhnhéshon'."

Rake'níha rakkarató:ni.

Niioronhiá:'a

TEHOSTERIHENHSERE'

Kiótikon iá:ken' kí:ken rón:kwe éhntsken'
ro'thahitáhkhe'. Sawátis ronwá:iats. Kiótikon ó:ni'
io'shátste' tsi rostorónkie'. Tsi nón:we ién:re'
ó:nenk iá:ken' tsi enhathahíta'. Iáh she's iá:ken'
tha'tahatate'nikonhá:ren' ne ahréhsake' kén ne hónhka'k
kén ahonwaia'títa'.

Tha'kakié:ro'k ki' iá:ken' hónhka'k tahohonwí:sere'.
Wa'thá:ta'ne' wá:rehre' enhoia'títa'. Wa'tanhohón:ti'
iá:ken' ne Sawátis. Iáh ki' tehawé:ren ratíta.

Wahén:ron' iá:ken' kí:ken tsi niká:ien' roia'ti-
ta'áhne, "Ka' wáhse'?"

Wahén:ron iá:ken' ne Sawátis, "Tekahson'kahró:rens."

"Enkonია'títa' káti' kén?"

Sahén:ron' iá:ken' ne Sawátis, "Iáhten, tewak-
sterihénhsere'." Ok ná' iá:ken' ó:ni' sahanhóhaienhte'.

Oróte' Karihwénhawe'



IAH TESHATA:TI'

O:nen kwáh kén' náhe' kiotáhsawen ki onkwehón:we tonhténkie's. Okia'ke áktek nón:we iehshotiio'tákie's. Ronekiohkowá:nen ó:ni' áktek nón:we iehonwanatenniéhtha' ne ahonterihwaienstá:na' ókia'ke iá:ken' kí:ken onkwehón:we enshón:newe' ne onkwehonwé:ke kwáh shé's iá:ken' iáh thé:nen' teshonhrónkha' ne onkwehonwehnéha'. Kwáh iá:ken' ó:ni' ókia'ke tohkárák niiohserá:ke, tó:wa' ó:ni' tohkárák niwenhni:take ronahténkion nék sé's ne shatikwáthos tsi nón:we nihatí:teron'. Tenshontátken' iá:ken' ne ronatenro'shón:'a ne onkwehonwé:ke kwáh shé's iá:ken' iáh tha'taontahontá:ti' ne onkwehonwehneha'. Kwáh shé's iá:ken' ó:ni' ókia'ke thihonnéhtha'.

Shiá:ta iá:ken' kí:ken okwehón:we iahonwaia'ténhawe' tsi iakenheion'taientákhkwa'. Wahonwahnia'sakwé:taren' iá:ken' ohén:ton tsi niio:re' tontahonwáhtka'we'. Tontahonwen'terónhna' ne onkwehonwe:ke. Tonsahontátken' ne ronatenro'shón:'a. Tsi iahonwawén:nara'ne' nia'té:kon wahonrai'wanontenniíón:hahse' tho niio:re' iá:ken' ó:nen iahónttoke', kwáh iá:ken' ne' kí:ken ronaten:ro' iáh teshatá:ti'.

Oróte' Karihwénhawe'

IEHATIIEN:TERE'SKWF'

Ne khók ki' ní:'i wakká:raien' rake'níha tsi
oh nahó:ten' rakaratónhkhwahkwe' kén' shiikwaksá:'a
né:ne rotikstohokon'kénha' né:ne iehatiién:tere'skwe'
tsi níawénhshere' rontónhahkwe' tá:we' nenhnísera'
ensewatkáthto' kí:ken kaniataratátie' enkontohétstake'
katsi'noniowá:nen's né:ne íah nonwén:ton tesewatkáththon
ok ó:ni' ne karonhia'kéhshon' enkontítie' sekén ne
katsi'noniowá:nen's é:so'nón:kwe eniakório'.

On:wa'ki' wenhniserá:te' kerihwaién:tere's oh
nahó:ten' ratí:ton'. Ne kí:ken ken nón:we nikaná:taien'
tenwatté:ni' íah kahnawá:ke thenskénhake'. Íáh ó:ni'
onkwehonwehnéha' thanhshako'nikonhrotákwen íáh ó:ni'
hónhka' thaonsaiontatíhseke' nonkwawén:na' enionkwate-
wennáhton'se' ok ó:ni' nonkwaianerénhshera' tenwatté:ni'.
O:nen ki' tiotáhsawen tsi teiotenionhátie'. Ne
sewatkwénie's ne ratihnara'kenhnéha'.

I:'i wakhiá:ton. Rówi Shehé:rese' rake'níhkénha'
ne rakkaratónhkhwahkwe'.

A:nen Karonhiahén:te' Sky
(Oróte' Karihwénhawe')

KAHNAWA:KE AOKA:RA'

Tóka' iá:ia'k-iawén:re' tewen'niáwe' tánon'
iá:ia'k-niwáhsen tsá:ta shiiohserá:te', tohkára'
nikahwatsí:rake onkwehón:we wahontená:taien' ákta'
kenhtá:ke tsi kaniataratátie'. Tóka' iá:ia'k-iawén:re'
tewen'niáwe' tánon' tsá:ta-niwáhsen shiiohserá:te'
wa'thoná:tahkwe' kén:'en, kahnawá:ke wahóntien'.

Tóka' iá:ia'k máir tsi nikaná:tes tánon' kaié:ri
máir na'tekanataká:ron. Tóka' wísk-niwáhsen tewen'niáwe'
niiá:kon ié:teron'. Skaniatará:ti othoré:ke neká:ti,
kenhtá:ke ná:kon neká:ti, St. Isidore tánon' St. Constant
éntie neká:ti shahré:'on é:neken neká:ti. Akta' ne
kahnawá:ke ne tiohtiá:ke. Tewáhsen wísk mńnit nikarí:wes
iá:ionwe' aiakohonwí:sere'. Tiohtiá:ke ne kwáh
tkanatowá:ne ne koráhne nekwá.

Ken' nikanatá:'a ne kahnawá:ke. Thó:ha akwé:kon
ne kahwá:tsire' rotinónhsote'. Otia'ke ne raotinónhsa'
ó:nen tiotí:ion ne tsi otstén:ra' wátston tho ní:iot tsi
ronón:nihske' norihwaká:ion. Otia'ke ó:nen énska
tewen'niáwe' tánon' wisk-niwáhsen niiohserá:ke tsi náhe'
tkáhson'. Teionáktane' ne raotinónhsa' ne ronón:ni'
ó:nen tsi ki' ní:iot ne ronátia'ke tsi rotinonhsó:ten ne
koráhne neká. Tsi iakenheion'taientákhkwa' ne kwáh

tkanonhsowá:nen.

Tsi tenhsatstekáwha' tsi kanatakwe'niió:ke ne
kí:ken enhsatkáththo': tsi iontenhninón:tha', tsi ionte-
rihstahninón:tha', iáh tha'tekaiahsonthá:ke ionteren-
naientákhkwa', tsi ratitsenhaiéntákhkwa', tsi ratirihtón:ke,
tsi ron'swáththa', tsi teiontska'hónhkhwa', tsi ionte-
iennahninón:tha', karonhianónnha' ionterihwaiensákhkwa'.

Tsi tiotierénhton enhsatkáththo' kana'tsheraktátie',
tsi iakenheion'taiéntákhkwa', tsi shakotitsén:tha',
Katerí ne konwá:iats ne ionterihwaienstákhkwa', teka-
iahsonthá:ke ionterennaientákhkwa', tsi ienohare'tákhkwa'
tehatatié:nas Billy Two-Rivers raó:wen, tánon' tsi
iehiatonhseratakwáththa'. Nia'tekanónhsake kanonhsó:ten.

Tiótkon teiotiweiennhará:'on ne kawennanó:ron'
tsi ionterihwaiensákhkwa' né:ne ken' nihonná:sa' rati-
ksa'okón:'a ronteweiénstha'. Katerí tsi ionterihwaienstákhkwa'
ne ne' ne tiotierénhton tsi niió:re' ne ahsénhaton
tánon' karonhianónnha' kaieríhaton tsi niió:re' iahiá:-
khaton ronteweiénstha'. Akwé:kon ronteweiénstha' ahontá:ti'
tánon' ahonterennó:ten', tiorhén:sha', o'seronni'kéha'
tánon' onkwehonwehnéha'. Kaié:ri tewen'niáwe' nihá:ti
iehonterihwaiénstha' sharhé:'on. Tsá:ta nikahiá:ton'
tsi niió:re' énska-iawén:re' thonwatirihonnién:ni.
Otia'ke onkwehonwehnéha' roteweiénstha' akté:shon'

ó:ni' nón:we nithotiión:sa iehonterihwaiénstha'. Otia'ke
ó:ni' "Manitou College" iehón:ne's

Tiótikon nia'té:kon ronaterihwahtentiá:ton ne
ràtinákere' ne ratiksa'okón:'a raoterihwá:ke. Tóhka'
niiohserá:ke tsi náhe' rotinonhsíson ne ratisa'okón:'a
raotitióhkwa' raoná:wen. Tóhka' na'teionáktane'
ionáktote' tsi nón:we ne ahatihson'karaké:tate' tánon'
tahatitsi'nehtará:ron. Ratiwennahnotákhkwa' ió:ien'
tánon' ó:ni' ió:ien' tsi nón:we niiontia'tahkariohstákhkwa'
kanonhsowá:nen ne eh nón:we nia'té:kon ó:ni' né:'e
nón:wa' ioterihwahtentiá:ton'. E' tho tehonhthénno'ks.
Akte' nithonéhtha' nahonte'nikonhró:ri'.

Tóhka' niiothiákwake rotiné:n:raien' ne iako-
tehiá:ron' : Legion, Knights of Columbus, Moose,
tánon' Marine Club. Ionkhihsothokón:'a o:ni' roti-
né:n:raien'. New Horizon Club konwá:iats.

Ronatiohkowá:nen ne kahwá:tsire' né:ne kanón:no
iehati'terón:ton tethatinatá:re's ne kahnawá:ke ne
akenhnhá:ke. E:so' rón:ti ne ratiiénthos ne áhsen,
né:ne ienakarótha', onenhste'ón:we tánon' onon'onsera'-
shón:'a.

Rono'éskwani' ahontawénha' kana'tsherá:kon tánon'
ratiksa'okón:'a tsi iontawenstákhkwa' rontawénhe's. Tsi
iakenheion'taientákhkwa' isi' na'oháhati tho nón:we

nihontawenstákhwa' tánon' tehonthénno'ks. Roti'ni-
konhró:ris ne rotinonhwaktanión:ni. Kén'k ó:ni'
niió:re' ne ronten'nikonhró:ris ne ratiksa'okón:'a
ronteweiénstha' ne ahatiká:we' ĩ:non akté:shon'
nón:we enthón:ne' ne kwáh tenhontátien'te' tsi
tenhonré:ron'.

Otia'ke ronon'éskwani' tewa'á:raton tánon' golf
tahonhthénno'ke'.

Né:ne kwah aonhá:'a roti'nikonhroriá:tha' nó:nen
enhatinenhríneken'ne' tánon' tenhonatatá:se' ne
ron'swáhtha'. Teiakhirénhsarons ne onkonkwe'tahshón:'a
ne ron'swáhtha'. Tsi nihá:ti akwé:kon rontatsnié:nons.

Ionkwe'éskwani' tsi niiátion kahnawá:ke iakwanákere'.

Kawennanó:ron'



Tho ní:kon

ONKWEHSHON: 'A SEWATAHONHSATAT
People Listen, All

Onkwehshón: 'a
people

Ietshiiatahónhsatat oh nahó:ten'
listen to all of them what

ionkhihsothokon'kénha' rón:ton'.
our grandparents of old they are saying

Onkwehshón: 'a
people

Shé:kon ionkwahronkhátie'
still we hear constantly

ionkhihsothokon'kénha' ra'otiwén:na'.
our grandparents of old their voice

Onkwehshón: 'a
people

Ionkhihsothokon'kénha' rón:ton',
our grandparents of old they are saying

"Thó nonkwá ionsásewe'
that way go back there

tsi nisewaweiennó:ten tánon'
to your culture and

tsi nitesewehtáhkwen."
to your belief

Onkwehshón: 'a
people

Ionkhihsothokon 'kénha' rón:ton',
our grandparents of old they are saying

"Thó nionsásewe' tsi nonkwá:ti ne
there all of you to way of the
return

orihwaká:ion."
way is old

Onkwehshón: 'a
people

Ionkhihsothokon 'kénha' rón:ton',
our grandparents of old they are saying

"Sásewatst ne sewawén:na'."
use them those your words
again

Onkwehshón: 'a
people

Ionkhihsothokon 'kénha' rón:ton',
our grandparents of old they are saying

"Ietshiiatahónhsatat ne kontíriio'
listen to all of the animals
them

tsi nahó:ten' rón:ton',"
to what they are saying

Onkwehshón:'a
people

Ionkhihsothokon'kénha' rón:ton',
our grandparents of old they are saying

"Ietshiiatahónhsatat ne otsi'ten'shón:'a
listen to all of the various birds
them

tsi nahó:ten' rón:ton'."
to what they are saying.

Onkwehshón:'a
people

Ionkhihsothokon'kénha' rón:ton',
our grandparents of old they are saying

"Ietshiiatahónhsatat ne otsi'nonwahshón:'a
listen to all of the various insects
them

tsi nahó:ten' rón:ton'."
to what they are saying

Onkwe'shón:'a
people

Ionkhihsothokon'kénha' rón:ton',
our grandparents of old they are saying

"Ietshiiatahónhsatat ne ononhkwa'shón:'a
listen to all of the various medicines
them

tsi nahó:ten' rón:ton'."
to what they are saying

Onkwehshón:'a
people

Ionkhihsothokon'kénha' rón:ton',
our grandparents of old they are saying

"Ietshiiatahónhsatat tsi karhahrónnion'
listen to all of them the forests

tsi nahó:ten' rón:ton'."
to what they are saying

Onkwehshón:'a
people

Ionkhihsothokon'kénha' rón:ton',
our grandparents of old they are saying

"Ietshiiatahónhsatat tsi kanientarahrónnion'
listen to all of them the rivers

tsi nahó:ten' rón:ton'."
to what they are saying

Onkwehshón:'a
people

Ionkhihsothokon'kénha' rón:ton',
our grandparents of old they are saying

"Ietshiietahónhsatat ne ratiweraráhstha'
listen to all of them the they draw the winds

tsi nahó:ten' rón:ton'."
to what they are saying

Onkwehshón:'a
people

Ionkhihsothokon'kénha' rón:ton',
our grandparents of old they are saying

"Sewatahónhsatat ne tìohkehnhkha' karáhkwa'
listen, all the light of day sun

tsi nahó:ten' wá:ton'."
to what it is saying

Onkwehshón:'a
people

Ionkhihsothokon'kénha' rón:ton',
our grandparents of old they are saying

"Sewatahónhsatat ne ahsonthénhkha' karáhkwa'
listen, all the dark of day moon

tsi nahó:ten' wá:ton'."
to what it is saying

Onkwehshón:'a
people

Ionkhihsothokon'kénha' rón:ton',
our grandparents of old they are saying

"Sewatahóhnsatat ne otsistohshón:'a
listen, all of you the various stars

tsi nahó:ten' rón:ton'."
to what they are saying

Onkwehshón:'a
people

Ionkhihsothokon'kénha' rón:ton',
our grandparents of old they are saying

"Ietshiiatahóhnsatat ne ietshihsothó:kon'
listen to all of them the your grandparents

tsi nahó:ten' rón:ton'."
to what they are saying

Onkwehshón:'a
people

Ionkhihsothokon'kénha' rón:ton',
our grandparents of old they are saying

"Ietshiiatahóhnsatat ne ionkhi'nisténha ohwén:tsa'
listen to her, all the our mother earth

tsi nahó:ten' ión:ton'."
to what she is saying

Onkwehshón:'a sewatahóhnsatat
People, listen, all

Tekaronhió:ken
Frank Jacobs Jr.





PEOPLE LISTEN

People

Listen to what our ancestors are saying.

People

We are still, constantly hearing our ancestors' voices.

People

Our ancestors are saying, return to your culture and belief.

People

Our ancestors are saying, return to the old ways.

People

Our ancestors are saying, return to your native language.

People

Our ancestors are saying, listen to what the animals are saying.

People

Our ancestors are saying, listen to what the birds are saying.

People

Our ancestors are saying, listen to what the insects are saying.

People

Our ancestors are saying, listen to what the medicines are saying.

People

Our ancestors are saying, listen to what the forests are saying.

People

Our ancestors are saying, listen to what the rivers are saying.

People

Our ancestors are saying, listen to what the wind
makers are saying

People

Our ancestors are saying, listen to what the sun
is saying.

People

Our ancestors are saying, listen to what the moon
is saying.

People

Our ancestors are saying, listen to what the stars
are saying.

People

Our ancestors are saying, listen to what our elders
are saying.

People

Our ancestors are saying, listen to what our Mother
Earth is saying.

People Listen.

Tekaronhió:ken
Frank Jacobs, Jr.



Tharonhiawá:kon, ne kén:ton', ráhawe'
Tharonhiawa:kon that means his holding

tsi karonhiá:te' ronónha' raotini:io ne
at in the heavens their their creator the

rononkwehón:we. Shako'nikón:rare' tánon'
real people he puts his mind and
on them

shakoia'tanonstá:ton. Karonhiá:ke nithawé:non
he protects them in heavens he came from

otsható:kon, watshatará:ken, e' thó wahoké:tohte'.
in clouds white clouds there he appeared

Wahshakona'tón:hahse' tánon' tahshakó:ion'
he showed them and he gave them

ne rononkwehón:we nattokháhtshera, nahontó:rate',
the real people wisdom for them to hunt

nahontátenonte', tánon' tsi nahatí:iere'
to feed themselves and how they are to do

nahatikwatá:ko' ne raonatsherónnia'.
how they would sew the their clothing

Tharonhiawá:kon means holder of the heavens. He was the great God of the Indians who presided over them and their hunting grounds. He came down from Heaven in a white cloud to help the Indian.

He showed and gave the Indian the skills to hunt, nourish and clothe himself. The Indians were sustained

Tharonhiawá:kon, wahshako'nikonhráta' ne
Tharonhiawa:kon, he put into their minds the

Tekanawí:ta, tánon' Aié:wate' nahianitiohkón:ni'
Tekanawi:ta and Hiawatha for they two to
organise

ne Kaianere'kó:wa. Kí:ken Tekanawí:ta, tánon'
the great good this Tekanawi:ta and
(League of the
Iroquois)

Aié:wate', kwáh í:ken tsi nihsennowanén:ne',
Hiawatha very much they their names were great

Huron thohténtion ne Tekanawí:ta, ok ne
Huron he came the Tekanawi:ta the other
from

Aié:wate', kanien'kehró:non'. E:so' wahanonhtonnión:ko'
Hiawatha he was Mohawk much they meditated

tsi nahní:iere' nahianitiohkón:ni'. E:so' iohserá:ke
what they two for they two to many years
could do organise

wahotiió'ten' tsi wahanitiohkwahserón:ni',
they worked to for they two to put together
the group

Tharonhiawá:kon inspired Tekanawí:ta, who was the founder of the League of Peace. Hiawatha was his spokesman. He was a chief of high rank among the Onondaga's. For years Tekanawí:ta meditated, and with inspiration from Tharonhiawá:kon, had elaborated in his mind the plan of a vast Confederation which would

| | | | |
|-----------------|-------|---------------------|------|
| Tharonhiawá:kon | é:so' | wahshako'nikón:ron' | tsi |
| Tharonhiawá:kon | much | he gave them mind | what |

| | | | | |
|---------------|----|--------|--------------|-----|
| nahonní:iere' | ne | tóhsa' | aonterihsi' | ne |
| what they | so | as not | to ever undo | the |
| should do | | | | |

Kaianere'kó:wa né:ne tsi nén:we' enkatátie'.
League of Peace it was to be forever standing

Wahnĩ:ron', tsi nikarĩ:wes enkahwatsiratátie'
they said that the length generations are coming
of time

| | | | |
|--------|------------------------|---------|---------|
| tánon' | entkarakwinekénhseke', | óhente' | entkah- |
| and | sun will come up | grass | it will |

| | | | | |
|-----------|--------|------------|----------|------------|
| niõhseke' | tánon' | ohné:kanos | kón:ne's | é' thó |
| grow | and | water | it flows | that there |

| | | | |
|------------|------------|-----|-----------------|
| nikari:wes | enkatátie' | ne | Kaianere'kó:wa. |
| length of | it will | the | League of Peace |
| time | stand | | |

Aié:wate', wahakwé:ni' wahona'tón:hahse'
Hiawatha he was able he could show them

| | | | |
|-----|-----------|-------------------|-----------------|
| ne | Atotárho, | ononta'kehró:non' | nahaia'tó:ten, |
| the | Atotarho | from the place on | he is that type |
| | | the hill | person |

ensure universal peace. The system which he devised was not to be for a short time but a lasting one. He said that this confederacy would last from generation unto generation, as long as the sun shines, the grass grows, and the waters run.

Tekanawī:ta sent Hiawatha to the wicked Chief

ne:ne aonhá:'a thronkwe'táksen, wahohró:ri'
this very much a bad person he told him

tóka' enháhsere' ne Kaianere'kó:wa tsi
if he will the League of Peace it
follow

tenkaté:ni' tsi rónnhe', é' thó ki na'á:wen'ne'.
it will change as his life that there is what
happened

Wahaié:na' ne Kaianere'kó:wa wa'thatté:ni'. Iáh
he took it the League of Peace he was changed not

teshronkwe'táksen, wahotinenhrá:ko' ne
was he a bad person they were surprised the

ononta'kehrón:non' tsi ní tsi tehotté:nion
people from the hill as so that he had changed

ne Roiá:ner Atotárho, akwé:kon wahonní:ron',
the chief Atotarho all they said

"Teionkwatonhwentsó:ni aiakwáhsere' ne
we want it for us to follow the

Kaianere'kó:wa."
League of Peace

Aié:wate' akwé nontá:rehte' ne wísk
Hiawatha all over he went the five

Atotarho of the Onondagas, to show him that this plan for peace would change his whole life for the better. When the Onondagas saw this change in their Chief, they all wanted to follow the new plan.

Hiawatha then went to each of the other four

nihononhwentsá:ke, Kanien'kehá:ka', Oneniothá:ka',
their nations Mohawks Oneidas

Ononta'kehá:ka' Kaio'konhá:ka', tǎnon'
hill residents Cayugas and

Shotinontowane'há:ka', wahshakohró:ri' tsi
nation of the big hill he told them that

niioiǎnere' ne akwé skáthne aontahontihéntho'
how good the all together for them to pull

tǎnon' akwé skén:nen' ahón:ton' ne onkwehón:we.
and all peaceful they the real people
would
become

Kwáh ionehrákwa tsi niioiǎnere' tsi ní tsi
what amazing it it is good the way

wahníkwatá:ko' notióhkwa', iáh ne té:ken ne
they two the League not it was not the
organised

iohsnó:re' aonnitiohkwaríhshi' nok né:ne tsi
it is fast for them to disband but the one is
the League

né:n:we'. Akwé wahatirihwanón:we'ne' nahatíhsere'
forever all they agreed they would
follow

tribes to tell them of this new way of living together
in peace. Finally the Mohawks, the Senecas, the Onondagas,
the Oneidas, and the Cayugas, all said they would
become part of the peace plan. Fifty chiefs gathered

ne Kaianere'kó:wa. Wisk-niwáhsen nihá:ti Rotiiá:ner,
the League of Peace fif-ty of them chiefs

wahontkennísa' katsénhakon. Wisk na'thatí:nerenke'
they had a around the five they bound
meeting Council Fire

ne kaién:kwire', ne kén:ton' tsi ó:nen wisk
the arrows which it means that now five

nihononhwentsá:ke ia'thóntieste', enhati'shátsten'ne'
tribes they were joined they will become
strong

skáthne enthontihéntho' skén:nen' enhón:ton'.
together they will pull peaceful they will become

Kaié:ri-iawén:re' tewen'niáwe' tánon' wisk-
four-teen hundred and fif-

niwáhsen shiiohseró:ten nihonanitiohkón:ni. Oh
ty at the year when they formed
the League

na'kénhkha' ne Tuscaroras ronatiá:tare'. Iá:ia'k
later the Tuscaroras they joined six

around the Council Fire. Tekanawí:ta said,

"We shall now combine our power into one great power which is the confederacy; we shall therefore symbolise the union of these powers by each nation contributing one arrow each, to be tied up together in a bundle with deer's sinews, which are strong. When they are tied together, no one can bend or break them and the confederacy shall endure."

Five arrows were then bound together to show that the five Iroquois tribes were now joined into a peaceful League of Five Nations. The League of Five Nations was believed to be formed in the year 1450. Later, when the

nihononhwentsá:ke wahón:ton'. Enska ne tsóhsera
 nations they became once the one year

ronnitiohkwaró:rokskwe' ne wisk-niwáhsen nihá:ti
 they used to meet together the fifty of them

Rotiiá:ner, katsénhakon enhontkennísa' nek
 chiefs around the they will make that
 Council Fire plans

ratihá:wi' ne raoneriáhsakon ne skén:nen'
 they bring the in their hearts the peace

tánon' ne karihwí:io nek enhonnonhtonnión:ko'
 and the good will only good thoughts

ne akwé ahotiiáneren'ne' ne raononkwe'ta'shón:'a.
 the all it would go well the their own people
 for them

Wahatiweientéhta'ne' tahoti'nikonhraién:ta'ne',
 they all learned to lay their minds out

iáh ní ó:nen tha'tehshontatetshá:nis.
 not longer now would they fear each other

Tuscaroras came into the League, it became the League of Six Nations. Once each year the fifty chiefs met around a great Council Fire. The chiefs who came to this meeting were supposed to have hearts full of peace and good will, patience, love, and honour, and to cultivate friendship. They were to think of what would be good for all the Iroquois, not for just the people of their own tribe. They learned to understand one another and they were no longer afraid of each other.

On:wa' wenhniserá:te' tewehiá:ra's né:ne Iá:ia'k
these days we remember that the Six

Nihononhwentsá:ke, tsi ronónha' ronanitsohkwi:son
Nations it is they they organised

ne Kaianere'kó:wa.
the League of Peace

Kahnawá:ke iá:ken' nohná:ken' Tharonhiawá:kon
at the rapids they was the Tharonhiawa:kon
say last time

shonwá:ken, ákta' ne Tiohtiá:ke. Thó ní tsi
they had near the Montreal there is as
seen him
again

shohténtion tsí ní tsi thawé:non otsható:kon
he left again as is as he had come in a cloud

tsi karonhiá:ke nionsá:re'.
to in heaven he went back.

That is how the League of Six Nations began.

Today, the Iroquois are remembered because of the
League of Six Nations. Tharonhiawá:kon was last seen
at Caughnawaga, near Montreal. He left the same way
he had come, in a white cloud.

This story was told to me by my grandfather and his friends.

Warisó:se Kaieríthon
Josephine Horne



SHA'TEWAHSIRI:HEN
Half a Blanket

O:nen ki ní:'i nakká:ra'
Now this mine my story

Wahón:nise' iá:ken' ki rón:kwe, ro'níha
Long ago it is said this man his father

skáthne ní:teron' O:nen ki rón:kwe
together they lived. Now this man

wahó:niake' tánon' ne ró:ne' iakotahkontá:ni' tsi
he married and the his wife she got tired that

thó rén:teron' ne rokstén:ha.
there he lived the he is old.

Sok ki rón:kwe iahotó:ri' ne roién:'a
Then this man out he sent the his son

iahoia'ténhawe' ne rohsótha tánon' karhá:kon
to take him out the he is old and woods in

iahóhtka'we'. Ki rón:kwe áhsire' tahó:ion'
let him go This man blanket he gave him

ne roién:'a tahohsirawén:'eke' ne rohsótha
the his son to wrap him the he is old

This is my story. A long time ago, this man lived with his father. The man married and brought his wife home. His wife got tired of the old man living with them.

So the man sent his son to take the old man into the woods and leave him there. But before they left, the

nó:nen ienhóhtka'we' karhá:kon.
the when there will he woods in
him let go

O:nen iá:ken' ki raksá:'a iahoia'ténhawe'
Now it is said this boy there he him took

ne rohsótha. Tsi ó:nen iahá:newe' ne
the his grand- And when there they the
father arrived

karhá:kon, sok ki raksá:'a ahsén:nen
woods in then this boy half

wa'throhwíha' ne áhsire'. Tho ki' tahóhtka'we'
he it split the blanket There just he him left

ne rokstén:ha tánon' tontahahtén:ti', shahá:wi'
the he is old and back he came he carrying back

ne sha'tewahsirí:hen.
the half blanket

Ki rón:kwe wahori'wanón:tonhse' ne roién:'a
This man he him asked the his son

oh nontié:ren tsi sha'tewahsirí:hen shahá:wi'.
what reason that half blanket he carries back

Ki raksá:'a wahohró:ri' ne ro'níha, "Kí
This boy he him told the his father, This

man gave his son a blanket to wrap the old man with.

So the boy took the old man into the woods. Before leaving for home, the boy took the blanket and tore it in half and took one half home with him.

On returning home, he was asked by his father why he had brought back half a blanket. The boy said, "I am

sha'tewahsirí:hen sekhá:wi', enkatatién:hahse'.
half blanket back I carry will I it save

Nó:nen í:se' ensakstén:ha'ne' ne én:katste'
When yourself you will be old this will I use

tenkoniahsirawén:'eke' nó:nen karhá:kon
I will wrap you up when woods in

ienkoniáhtka'we'."
there will I leave you.

O:nen iá:ken' ki rón:kwe wahanonhtonnión:ko'
Then it is said this man he it thought over

tsi nahá:iere', sok wahohró:ri' ne roién:'a
what he did then he him told the his son

aonsahonónksa' ne rohsótha.
to back he him the his grand-
go get father

Kí:ken oká:ra' ne né:'e kén:ton' ne tóhsa'
This story the it is it means this do not

aionkhiiatahkón:tahse' ne onkwe'taká:ion's. Tá:we'
let them in our way be the people are old It is coming

ne ohnísera', í:'i ká:ti' ó:ni' entionkwaién:ta'ne'.
the day ourselves then also will we become old.

saving it. When you get old, I will use this half of the
blanket to wrap you in when I leave you in the woods."

The man thought over what he had just done. So he
told the boy to go back into the woods and get his grandfather.

There is a moral to this story. We should treat the
old people kindly, for we too, someday, shall get old.

Konwatién:se'
Carolee Jacobs, told to her by
her mother

RAWE:RAS RO:NE'

The Thunderer's Wife

Karhá:kon thati'terón:tahkwe' iá:ken'
in forest they used to live they say

kí:ken kahwá:tsire'. Tóhka' nihotiwí:raien'.
this family a few they have children

Kháre' ó:nen kí:ken wahonwatinatahré:nahse'
finally now this they were visited

kaná:takon thatinákere' rontátenonhkwe'.
downtown they lived they were relatives

Wahontshenón:ni' kí:ken ne shakotiien'okón:'a
they were happy this the their children

tsi ó:nen wahonatero'seraién:ta'ne'.
that now they had friends.

O:nen ki' iá:ken' karhá:kon niahatitakhenóntie'
now just they say in forest they started to
run into

wahonhiákha' sewahió:wane', thontaiawénhstsi'
they went to large fruit all of a sudden
pick fruit

In the forest stood a house where lived a couple who had several children. They seldom saw any strangers. One day, they had visitors, relatives who lived in town, who brought with them a girl. The children were so happy to have a new friend to play with and they skipped through the woods and soon were happily picking apples.

| | | |
|-------------------|-----|----------------|
| taie'nahkwáweron' | tsi | na'okén:nore' |
| it poured down | so | much it rained |
| buckets | | |

Tewanine'kara'wánions tánon' teio'tónhahre'
lightning was striking and it was noisy

iowé:ren tánon' wa'tkaweratá:se' khé ki'
it thundered and winds came right just

| | | | |
|--------|-------------|----------------|--------|
| é' thó | okwiró:kon | wahontáhsehte' | kĩ:ken |
| there | under trees | they hid | this |

na'tewatenón:ianihte' tánon' iá:ken' é' thó
it got so terrible and they say there

niiohsnó:re' ontóhetste' tánon' ontoríshen'.
as it is fast it passed and it stopped

Tontakarahkwíneke'ne' sanwenhniserĩ:iohste' nek tsi
the sun came back out the day got nice but
again

akwé:kon kí ioná:nawen. E' thó kí:ken ne
all this it is wet there this the

| | | | |
|-----------------|-------------------|------|----------|
| ratiksa'okón:'a | wahontahrakétsko' | kwáh | iá:ken' |
| children | they lifted their | till | they say |
| | heads | | |

Suddenly, with a clap of thunder, rain poured down in buckets forcing them to take shelter under the nearest tree. It was a terrible storm, lightning flashing in all directions, winds blowing every which way, and the noise of the thunder frightening. Just as suddenly, the storm ended. The sun shone brightly upon the glistening wetness all around. Most of the children

énhsehre' sha'tekarhĩ:hen wa'tiekháhsi' tsi
 you will half the forest they as
 think separated

na'tonsaiohswáthe'ne' tánon' ahsén:nen nǝn:we tsi
 it got bright and half where that
 again

tekeniíáhse tekeniksá:'a wa'onatshatǎrhahse'.
 two of them two girls they saw a shadow.

O:nen wa'thiáttoke' tsi iakǝn:kwe tsi
 now they noticed that a lady that

iakote'wháhsate' kǐ:ken wa'tkenikahrá:ra'ne'.
 edge of her skirt this their eyes fell upon

O:nen kwáh ohtekén:'en wa'kenika'én:ion' tsi
 now just completely they examined that

iakǝn:kwe kǐ:ken kwáh tsi iotérhate' nǐ:iete'.
 lady this just at the edge of she stood
 the forest

Isi' ne ká:ti ia'teieká:nere'. E' thǝ iǎ:ken'
 there other side she was looking there they say

niiehnén:ies tsi niiokwǐ:res kahon'tsistǝskon
 she was tall as the length all in black
 of trees

ran for home but for the two girls who had remained under a tree. As they lazed there, a dark shadow fell upon them and then moved on. They looked to see what it might have been, and as they gazed at the shadow, they realised that they were looking at the bottom edge of a lady's skirt. Their eyes moved up and it was a lady! A lady as tall as the trees, all dressed

iakótston tó:k niiako'khá:res tánon' teiakoteweiáhere'
she used so very long skirt and she wore a cape

tó:k niiotsiwiién:tes tsi iakononhwaró:ron
very long pointed so she wore a hat

tánon' ionterahkwawerhóhstha' íehawe' tsenekwá:ti
and umbrella she carried on her left

ne ká:ti. Tsik niió:re' ia'tkenikahraién:ta'ne'
side by as it is far their eyes could see

e' thó niiohsnó:re' ka'k thónhte niahá:'en
there as it is fast somewhere she went

ne iakón:kwe.
the lady

Tsi ó:nen ne tekeniksá:'a ionsákenewe'
at when the two girls they got back

tánon' satiathró:ri' nahó:ten' wa'tiatkáhtho',
and they told what they saw

wahshakohró:ri' ne' neksá:'a ronwa'níha,
he told them the girl her father

in black. She had her back to them, and she seemed to be watching the receding storm clouds. She wore a long cape, a hat with a long point at the top, and on her left arm hung a folded umbrella. In the instant that they fully comprehended what it was that they saw, she disappeared.

Later, when they had told what had happened, the girl's father told them,

"Iotahkwáhsa' tsi iáh teietshiwennará:'on
 it is too that not did you address a
 bad word to her

ase'kén rawé:ras ónhte thǐ:ken ró:ne'
 because he perhaps that his wife
 thunders

wa'etshǐ:ken' káti' nón:wa' aietshiiatera'swá:wi'."
 you saw her perhaps maybe she might have given
 you good luck



"It's too bad that you didn't speak to the lady of the storm; she is said to be the wife of the Thunderer and gives good luck to anyone who speaks with her."

Konwatsi'tsaién:ni

Rita Phillips

AKON:WARA'

O Face

Shiikwaksa'okón:'a akón:wara' shé's
when we were children O Face then

rónts'tha' ne rotikstén:ha nahontewirahserón:ni'.
they use the they are old to straighten the
children

Tsi - ní:iot tsi ionkhihró:ri iáh ónhka'
as so it is as we are told not anyone

ne wén:ton teiotón:'on aiakothró:ri' ne
the ever it happens for them to the
tell

oh nihaia'tó:ten aśe'kén akwé:kon ronenhé:ion
what kind of body because all they have
he had died

tsi niiá:kon ne ronwá:ken. E' thó tsi
that everyone the they have there that
seen him

na'teiotenonhianíhton nihakonwaró:ten tiótkon
so horrible it is as his face is always

ahsatakónhson' tehotstikahwenháti'e's ratonkwe'tí:saks
in shadows he travels along he hunts people

When we were children, the older people would
frighten us with the terrible name of O Face who
travelled in the dark at night, always ready to catch
the wicked or unwary person.

rotateweienentá:'on ahshakoié:na' ne
he is ready always to catch someone that

iakaonkwe'táksen tó:ka' iáh teiontate'nikón:rare'.
person is bad or not his mind is on it



His face, it is said, is so horrible that no one
ever survived after seeing him face to face.

Konwatsi'tsaïen:ni

Rita Phillips

AKON:WARA'
The Ugly Face

E:so' iohserá:ke ó:nen tsi náhe' ne
many years now that ago the

kahwá:tsire' skáthne ie'terón:tonhkwe' sahsótha
family together they used to live your grand-
mother

sa'nistén:ha ia'níha tánon' ratiksa'okón:'a.
your mother your father and children

Kí:ken iatathróna' wá:nehre' ahniíá:ken'ne'
this they are they they would go
married wanted out

ahiatkenhnisa'ánha'. Wahshakotiri'wanón:tonhse'
they would go to they asked her
a meeting

ne akokstén:ha aiontennón:na' tsi nikarí:wes
the she is old would she watch as the length
of the matter

enhotiiakén:'en. Wa'í:ron' nakokstén:ha, "Ió
they will be out she said she is old OK

nek ki' tsi shehró:ri tha'tehontó:tat ase'kén
but tell them they keep quiet because

Many years ago when families lived together, that is, grandparents, mother, father, and children, this mother and father wanted to go out to a meeting. They asked the grandmother to take care of the children while they were gone. The grandmother said, "OK, but tell the children to be quiet as I am very tired."

é:so' tsi tewakwishenhé:ion."
much so I am tired

Tsi niiohsnó:re' tsi iahniiǵ:ken'ne' óksa'k
as it is fast as they went out right
away

tahontáhsawen' ne kanonhsakwé:kon wa'thonrahtáthon'.
they started the all over the they were running
house

Ne rotihsótha tia'tekǵ:konte' ion:ton',
the their very often she said
grandmother

"Tha'tesewató:tat," nek ki' tsi iáh ónhka'
all of you be quiet but not anyone

teiakotahonhsatǵ:ton. Khǵre' ó:nen wahonwatihró:ri',
they did not listen finally now she told them

"Tóka' iáh tha'tensewatotǵthe' átste ienkwaia'tón:ti'
if not will you keep quiet outside I shall throw
your bodies

tánon' akón:wara' ientshisewaia'ténhawe'."
and ugly face he shall take you

Iáh tha'tehonatotǵ:ton ratitakhenóntie's
not did they quiet they running around

As soon as the parents left, the children started running around the house. The grandmother kept telling them to be quiet but nobody listened. Finally, she told them, "If you don't stop I shall throw you out the door and let Ugly Face take you,"

The children kept right on making a lot of noise

thihshakotiié:ron' ne akokstén:ha. Wahshakotina'kón:ni'
they tease her the she is old they made her angry

wa'onte'nién:ten' ahonwatié:na' ne ratikowá:nens
she tried she would catch the they are
them bigger

nek ki' tsi sótsi' tehotí:ka. Akwáh ken'
but too they run the very small
fast

nithrá:'a rate'niéntha' ahshakona'ké:ren' ne
he is small he is trying he would do like the
them

ronátia'ke. Tsi rotohetstonhátie' tahonwaié:na'.
others as he is passing she grabbed
him

Tsi kanhohká:ronte' átste iahonwá:reke' wa'í:ron',
to the door opens outside she pushed she said
him out

"Kóh akón:wara' kí:ken raksá:'a," tánon'
here ugly face this boy and

saiehnho'haienhte'.
she slammed the door

and running, teasing the old lady. They made her very angry. She tried to catch the older children, but they were too swift for her. The youngest was trying to do as the rest of them, and as the child was passing, she grabbed him and, going to the door, pushed him out, saying, "Here, Ugly Face, take this child," then she slammed the door.

Kén'k nikarí:wes sahonwenhnónksa' ne
a bit matter is she went back to the
 long so get him

raksá:'a iáh teshonwaia'tatshénrion. Iáh
boy not could she find him not

nonwén:ton teshonwá:ken ne raksá:'a.
ever did they see the boy.
 him again



A while later she went back out for the child
but she could not find him. The child was never seen
again.

Rake'níha rakkaratón:ni
my father he told me

Niioronhiá:'a

This story was told to me
by my late father,
Louis T. Curotte

Mae Montour

KAIENTEREHSTAHHWA'

Omens

1. Tóka' ensathón:te'ne' ónhka'k taieken'to'ókhoŋ'
if you will hear someone one is knocking

tánon' iáh ónhka' té:ien's né kén:ton' tsi
and not anyone there is that it means that

ónhka'k eniaíheie'.
someone one will die.

If you hear someone knocking, and no one is there, that means that someone will die.

2. Tóka' ensatatshatárhahse' ónhka'k thó í:ien'
if will you shadow see someone there one goes

tánon' iáh ónhka' té:ien's, né ni' né:'e
and not anyone there one the also that
goes

kén:ton' tsi ónhka'k eniaíheie'.
it means that someone one will die

If you see someone's shadow, and no one is there, that also means that someone will die.

3. Tóka' ehtá:ke iorhá:tare' ne ó:nenhste' né
if low stalk the corn that

kén:ton' tsi iáh é:so' thakanié:ien'.
it means that not much would snow fall

If the cornstalk is low, that means that there will not be much snow.

4. Tóka' sót'si' ehtá:ke otsi'nahkontahkwá:ne
if too low creature in a hive

ronatshi'nahkón:ni né ni' né:'e kén:ton' tsi
they their nest that also that it means that
make

iáh é:so' thakanié:ien'.
not much would snow fall

If the bee's nest is too low, that also means that there will not be much snow.

5. Tóka' ohwhará:ne í:ions tsi kahón:tsi
if fur on it it is that it is black
long

rohá:te' né kén:ton' tsi eniohseresónhake'.
his that it means that winter will be long
stripe

If the caterpillar has a long, black stripe, that means that it will be a long winter.

6. Tóka' okariahtá:ne énhtsken' kanónhskon
if it bites its will you house in
fill him see

akohserá:ke né kén:ton' tsi sénha' enwathó:rate'.
winter in that it means that more will it get cold

If you see a mosquito in the house in the winter, that means that it will get cold.

7. Tóka' tensahonhtá:kahre' né kén:ton' tsi
if will your ears that it means that
ring

thé:nen' enhserihwá:ronke'.
something will you news hear.

If you hear a ringing in your ears, that means that
you will hear some news.

8. Tóka' tsi'tén:'a onahstonhkwá:ke teniaón:ko'
if bird window on will it hit

né kén:ton' tsi iáh tekarihwí:io nahó:ten'
that it means that not good news what

enhserihwá:ronke'.
will you hear

If a bird hits your window, that means that you will
hear bad news.

9. Tóka' ensahsi'tarónhkhwen' né kén:ton' tsi
if will your feet itch that it means that

ká'k iénhse' tókani' tenhsenonniahkwá:na'
some there will or will you dancing go
where you go

If your feet itch, that means that you will go somewhere
or you will go dancing.

10. Tóka' ensakahrani'kerón:ko' tsi sehsenekwá:ti
if will your eye twitch at beyond your side

ensaná:khwen'.
will you get
angry

11. Tóka' ensakahrani'kerón:ko' tsi sehseweienteh-
if will your eye twitch at your right

nahó:ten' enhserihwá:ronke'.
what will you hear.

12. Tóka' ensahsiarónhkhwen' tsi sehsenekwá:ti
if will your palm itch at beyond your side

13. Tóka' ensahsiarónhkhwen' tsi sehseweientehtáhkwen
if will your palm itch at your right

nekwa' né kén:ton' tsi ensahwistaién:ta'ne'.
side that it means that will you money get

If your right palm itches, that means that you will get money.

14. Tóka' é:neken karahkwákta' iostsísto' né
if up moon near star that

kén:ton' tsi tsakothonwí:sen' eniaíheie'.
it means that woman will she die

If a star is over and near the moon, that means that a woman will die.

15. Tóka' ná:kon karahkwákta' iostsísto' né
if under moon near star that

kén:ton' tsi rón:kwe enhrénheie'.
it means that man will he die.

If a star is under and near the moon, that means that a man will die.

16. Tóka' ia'tesa'kharaké:tote' né kén:ton' tsi
if your slip is peeking that it means that

enhsaten'niotá:na'
you will go to a wedding

If your slip is showing, that means that you will go to a wedding.

17. Tóka' atókwa ensá:sen'se' né kén:ton' tsi
if spoon will you drop that it means that

ónhka'k éntien'.
someone will one come

If you drop a spoon, that means that someone will come.

18. Tóka' ieksohare'tákhwa' onia'tará:'a ensá:-
 if one to dish wash rag will
 uses it you

sen'se' né kén:ton' tsi ónhka'k iáh
drop that it means that someone not

teiakokwéniens eniesanatahré:nahse'.
is one tidy will one to visit you come

If you drop a dishrag, that means that an untidy person will visit you.

19. Tóka' iáh thasa'nikonhrón:ni' ahsani'tskwa-
 if not would your mind make would you seat

hra'tsherakarhátho' né kén:ton' tsi ónhka'k
setter tip over that it means that someone

rohné:ka enthatáweia'te'.
he liquid will he enter

If through no fault of your own, you tip over a chair, that means that a drunk man will enter your house.

20. Tóka' ó:niare' ensatetshá:ten' karihwaka'tén-
 if snake you will dream scandalous

htshera kén:ton'.
matter it means.

If you dream of a snake, that means scandal.

21. Tóka' entéhsia'ke' sanónhkwis nó:nen
if will you cut your hair when

oráhkwise' sénha' iohsnó:re' ensewaterhiá:ron'.
moon new more it is fast will it grow back.

If you cut your hair during the new moon, it will grow back much faster.

22. Tóka' tenhsatianakarhátho' né kén:ton' tsi
if will you put the shoe that it means that
on the wrong foot

ohkwá:ri tentsátera'ne'.
bear will you two meet

If you put the wrong shoe on the wrong foot, that means that you will meet a bear.

23. Tóka' sótsi' é:so' ensaiéshon' iáh
if too much will you laugh not

tekarihwáhstha' né kén:ton' tsi tenhsahséntho'
does it reason that it means that will you cry
use

If you laugh for nothing, that means that you will cry.

24. Tóka' owirá:'a oshon'kará:ke rotahónhsate'
if baby floor on he listens

né kén:ton' tsi ó:ia' ensehsewirahní:non'.
that it means that another will you baby buy

If a baby listens on the floor, that means that you
will have another baby.

25. Tóka' tóhka' niionkwé:take eniaíheie'
if several of people will they die

né kén:ton' tsi Shonkwaia'tíson thotén:niote'.
that it means that he our bodies he is having
finished a wedding

If quite a few people die that means that our Creator
is having a wedding.

| | |
|-------------|----------------------|
| Wathahí:ne' | tanon' Konwatién:se' |
| Mary | and Carolee |
| Nicholas | Jacobs |

TIAWERON:KO KANEHON OKA:RA'

Ne k̥a:ti' k̥i:ken oká:ra' wahón:nise'
the that this story long ago

| | | | |
|---------|-----------------|----------|-------------------|
| rón:kwe | wahaientakóha'. | Skáathne | tettiatera'né:ken |
| man | he went to get | together | they two side by |
| | wood | | side each other |

akohsá:tens. Tetiate'serehtahnontérha' wahshako-
one is astride it links it drags he them

ia'tanión:ten'.
bodies hitched

| | | | |
|-------|--------|--------------|------------------------|
| 0:nen | ká:ti' | wahahtén:ti' | wahaientakóha' |
| now | then | he went away | he went to get
wood |

| | | | |
|--------|-------|----------------|-----------------|
| tánon' | né:ne | akohsá:tens | aonatahkwénnia' |
| and | that | one is astride | harness |

| | | |
|-------------|------------|---------------|
| tiawerón:ko | aotinéhon | ionniá:ton. |
| eel | their skin | it is made of |

| | | | |
|-----|------------|-----------|--------------|
| Tsi | iahá:rawe' | karhá:kon | tontáhsawen' |
| as | he arrived | at forest | it started |

Long ago a man went to get wood in the forest. He hitched two horses together side by side on an adjustable wagon.

Now then he went into the forest to get wood. The horses' harness was made out of eel skin. As he arrived at the forest, it started to rain. He

wa'okén:nore'. laháhsa' ki tsi raientákwás
it rained he finished this then he cuts wood

tánon' akwé:kon ka'seréhtakon waháta',
and all in it drags he put in

sok . tontahahtén:ti'. Tsi tahshakotó:ri' ne
then he started to as he started them the
return home going

akohsá:tens, tetsá:ron tatiatihéntho' iáh ki'
one straddles both of they pulled not even
them

tetiohténtion ne tetiate'serehtahnontérha'.
did it move the it drags it adjusts
forward

Aonahkwénnia' wa'tewatirón:ten' khe tka'seréhtaién'
their it started just it drags it
harness remained

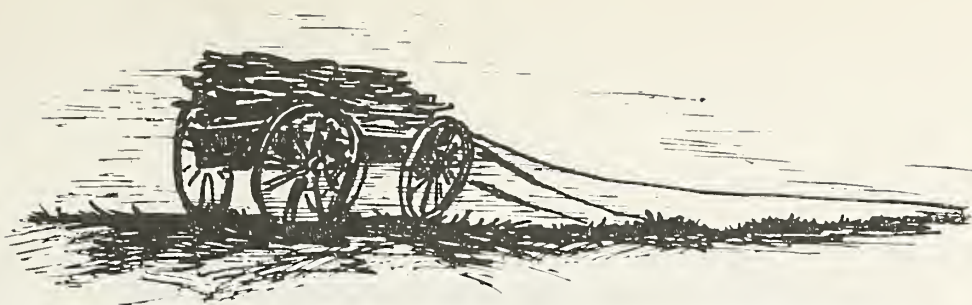
karhá:kon.
in forest

Ionsá:rawe' tsi thonónhsote' tánon'
he arrived at his house and
stands there

wahshakohkwenniah rá:ko' ne akohsá:tens tánon'
he removed their harness the one straddles and

finished cutting the wood, and loaded it on to the wagon, then he started for home. He got the horses to go, but the wagon did not move. Their harness started to stretch. The wagon remained in the forest.

As he arrived at his home he removed the harness from the horses and hung it on the fence.



aten'enhrá:ke wahrotárhoke' ne aonakwénnia'
on the fence he strapped it the their harness

Tsi niwahsón:tes onstáthen' ne
as long night it dried the

tiawerón:ko aonéhon sok tontáhsawen' ontó:roke'.
eel skin then it started it shrank

Orhon'ké:ne wahá:ie' iahatke'tó:ten' tsi
in morning he woke up he looked out of at

tekatsiserá:ton' wahonehrá:ko' tsi nahó:ten'
window he was surprised at what

wahatkáhtho'. Tho aten'enhrákta' ka'seréhtaiien'
he saw there near the fence it drags it lay

ne tetiate'serehtahnontérha' tetkaientáhere', ne
the it drags it adjusts full of wood the

roientákwen.
he cut wood

During the night the eel skin dried and started to shrink. He woke up in the morning and looked out of the window and to his surprise he saw the wagon parked next to the fence full of wood that he cut.

Wahón:nise' shihatiká:ratons ne thotí:ien'skwe'.
long ago as they used to tell the they were older

Tekaronhió:ken

Frank Jacobs, Jr.

IEHWISTA 'EKSTHA'

| | | | | |
|----|--------|----------|-----|----------------|
| Ne | kĩ:ken | aoká:ra' | tsi | iohwistén:ton' |
| is | this | story | of | metal hanging |

| | | |
|---------------------|---------------------|-------------|
| teieiahson'thǎ:ke | ononhsatokenhtǐ:ke. | Wahǎn:nise' |
| one signs the cross | in the holy house | long ago |

| | | |
|-----------------|------------|---------------------|
| o'seronni'ʃn:we | ronontĩ:io | wahshakorharátsten' |
| real axe makers | their king | he promised them |

| | | | |
|--------------------|------|---------------|-------------|
| Kahnawa'kehrɔ:non' | tsi | enhshakɔ:ion' | iehwista- |
| people of rapids | that | he will give | one strikes |
| | | them | |

'ékstha'. E' tho kî' na'á:wen'ne', tahaténniehte'.
metal with that there just it happened he sent it
it

| | | | |
|-------------------|--------------|------------|------------|
| Kahonweia'kowáhne | tahonné'ta', | Kahnawá:ke | taiawenon- |
| in a large boat | they put | at rapids | it was |

hátie'.
coming

Ne' thó nǝn shontakahá:wi' o'seronni'ǝn:we
it there place as it carries people of France

This is the story of the church bell in the St. Francis Xavier Catholic Church in the village of Caughnawaga, Province of Quebec, near Montreal. The King of France promised the Mohawk Indians he would give them a bell for their church. He fulfilled his promise, and a bell was put on a ship for Caughnawaga.

| | | | |
|--------|--------------------|------------------------|-----|
| tānon' | tiohro'shaka'ɔn:we | ronateriiohne', | Iah |
| and | English people | they were fighting not | |

tə:io ne iehwista'əkstha' nə tsi
arrive the one strikes metal because
 with it

wa'konwaié:na' ne kahonweia'kó:wa, iahatīhawe'
they caught it the large boat they took it

wastohronón:ke takarhárho' wahonnetáhko' tsi
(Bostonian place)it docked they took out
United States

| | | | | |
|-----------|------------|-----|--------------|------|
| nahó:ten' | wá:tahkwe' | ne | kahón:wakon. | Akwe |
| whatever | it was on | the | in the boat | all |

wahontenhní:non' é' thó wa'karátie' ne
they sold that there along with the

| | | | | |
|-------------------|-----|-------|--------------|-----|
| iehwista'ékstha'. | Tsi | nón | tkaná:taien' | ne |
| one strikes metal | at | where | town lies | the |
| with it | | | | |

Deerfield thatinákere' wahatihni:non'.
Deerfield they live there they bought it

| | | | | |
|--------|-------|-------------------|-----------|----|
| Kháre' | ó:nen | wahotinónhton'ke' | naón:we' | ne |
| until | now | they became | for it to | |
| | | impatient | arrive | |

At that time the French and English were fighting one of their wars. The bell never reached its destination. The ship was captured and docked in Salem, Massachusetts, and the cargo was sold, including the bell. The town of Deerfield purchased the bell.

In the meantime, the Mohawks were waiting for their

raotihwīsta', wahatirihwī:sake' ka' nieiawe:non.
their metal they sought the where it had gone
reason

Wahatirihwatshén:ri' tsi wa'konwaié:na' ne
they found the reason that they caught it the

kahonweia'kó:wa tánon' tsi wastohronón:ke
large boat and that United States

tiorhárhon Deerfield tkonwá:iats, tsi nón
it was Deerfield they call it at the place
docked

tioia'totarhé:'on.
it was caught

Wahontenenhrón:ni' Kahnawa'kehró:non' tékeni
they formed a group rapids people two

tewen'niáwe' nihá:ti, ratsihénhstatsi tánon'
hundred of them priest and

o'serón:ni' shotár wahonhtén:ti', wahonnesákha'
axe makers soldier they went away they went to look for

ne iehwista'ékstha'.
the one strikes metal
with it

bell. They inquired about it and found that the ship
had been captured and the bell had been sold in Deerfield.

The Mohawk Indians got together a war party of 200
braves along with some French soldiers and a priest, and
together they left for Deerfield to find the bell.

Karfi:wes wa'thontstikáwha' tsi niió:re'
length of they wandered to so it is far
time

iahón:newe' ne Deerfield. Akohsera'kehkó:wa
they arrived Deerfield middle of winter

1704 shiiohseró:ten. Teiotenonhianfihton tsi ní
was the year it was frightful as the

tsi wahonterfi:io'. E:so' wahonníheie'. Wahontkwé:ni'
as they fought many they died they won

ne onkwehón:we. Wahshakotiié:na' ótia'ke ne
the real people they held them some the

wahshakoti'shén:ni'. Ne' thó nón shontakahá:wi'
they defeated them in there place as it carries

tóka' sótsi' é:so' rá:ti enhonníheie' ne
if too many of them they will die the

onkwehón:we, tenhshakotiia'taiestáhsi' né:ne kwáh
real people they will look over people which truly

rotiia'tahní:rons tánon' kén' nithotiién:ha
they are strong and small they are aged (males)

rotisken'rakéhte' entehshakotiia'ténhawe' tánon'
boys they will bring them and

It was in the winter of 1704 that they arrived in Deerfield. A fierce battle took place, the town was taken, and many lives were lost. The Mohawks captured some prisoners. In those days, if they lost too many warriors, they would pick out the strongest young males, capture them, and bring them to their

thó nĩ tsi enhshakonehiá:ron' tsi nĩ ne
there that as they will raise them as that the

shakotiiien'okón:'a, kháre' ó:nen enhóniake'
their children until now he will marry

onkwehón:we. E' thó nĩ tsi ótia'ke
real person that there that as some

rotihsenaiéntá:'on ne tiorén:sha' ken'tá:here',
they got their names the English Scottish

arísmen, tánon' o'seronni'kéha kahsenna'shón:'a
Irish and way of axe makers names

ne kĩ:ken raotihsenai'shón:'a ne shakotiié:na
is this their names the they caught them

Kahnawá:ke shakotiiá:the.
to rapids they brought them.

Wahatihwistaniiontá:ko' ononhsatokenhtí:ke
they took the metal off at the holy house

kahnia'sá:ke, karontá:ke wahatihwánerenke'.
on its neck on log they tied it

Wahonnenhsá:ren' é' thó nĩ tsi tontahonhtén:ti'.
they carried there the as they returned
over their shoulders

village to raise like their own sons. Eventually they would marry into the tribe. This is how and why some of the Indians have English, Scottish, Irish, and French names. The names came from the young boys who were captured in the wars.

The bell was taken from the church steeple and fastened to a beam with a crossbar at both ends, so that

Kwáh ĩ:ken tsi rotiháhes tsi niiǫ:re'
truly it is that their road to as it is far
 was long

enshón:newe'. lohseratshá:ni é:so' wahatiiésha'
they will fierce winter much they suffered
return

| | | | | | |
|-----|------------|------------|-----|---------|--------|
| tsi | niioháhes, | iohaháksen | tsi | rón:ne' | tánon' |
| at | as the | bad roads | as | they | and |
| | road is | | | walked | |
| | long | | | | |

wa'tkanien'kwataséhon'. Ne é:so' wahatiiésa'
it snowed the much their hardship

| | | | |
|---------|-----|--------------------|----------|
| shotár, | tsi | thotikwi'tsháhere' | niiɔ:re' |
| soldier | to | their knees | that far |

| | | |
|----------------------|-------------------|-----|
| iehatihsinénhserons, | wahshakoti'nósha' | ne |
| their legs were | they were | the |
| falling in | jealous | |

| | | | | |
|-------------|---------|-----|----------------------|----|
| onkwehón:we | ne | tsi | tehonathwén:karonte' | ok |
| real people | because | | they had snowshoes | on |

| | | | | |
|---------|-------------|----------------|------------|-------|
| é:neken | thihón:ne'. | Wahonská:neke' | ronónha | ó:ni' |
| top | they were | they were | themselves | also |
| | walking | longing | | |

the men could carry it. They left Deerfield and started the long trek homeward. The winter was cruel, and there were many hardships, one of them the rough terrain. The snowstorms were hard to endure, especially for the French soldiers, who suffered a great deal from the toil of wading through the deep snow. They envied the Indians who were wearing snowshoes and who seemed to be floating on top of the snow. They did not show signs of fatigue

ahotiiɛn:take' ne kahwɛn:kare', tsi niiʃ:re'
they should the snowshoes because
have them

tsi tehotihwishenhɛ:ion tsi rotiniotkawenhɛtie'
as they were tired that they were laboring
through the snow

ok ne onkwɛhɔn:we iáh thé tewé:ne
but the real people not at all did it show

tahotihwishenhɛ:ion.
they would be tired.

Tonsahatitharɔ́nnion', ia'thotirihwaiɛn:ta'se'
they discussed they decided

tsi enkonwaia'táta' ne iehwista'ekstha'.
that they will bury the one strikes metal with it

Wahɛn:ron' ne roiɬ:ner,
he the he is chief

"Kɛn:'en kaniatarákta' entewaia'táta';
here near the lake will be bury it

kenkwité:ne tentitewakóha'."
in spring will we come get it

E' thɔ kɪ na'a:wen'ne', wahatiia'táta'.
that there this it happened they buried it.

as did the French soldiers.

The party decided to bury the bell on Lake Champlain
and come back for it in the Spring. When Spring came,

Ia'kāhewe' ne kenkwité:ne sahontenenhrón:ni'
there it the spring they grouped back
arrived together

é' thó nionsahón:ne' kaniatarákta' ne Champlain
that there they retraced near the lake Champlain
their steps

sahonnetáhko' ne iehwista'ékstha'. Ronatshennonihátie'
they took it the one strikes metal they were happy
out with it

tsi sahatíhewe'. Kháre' ó:nen iahatihwistaniión:ten'
that they brought time now they hung the metal
it back

ononhsatokenhtí:ke. E:so' iohserá:ke wáhontste'.
in the holy house many years they used it

Ohiarí:ha shiwennhni'tó:ten wísk-iawén:re'
June in the month of fif teen

shískare' tiohton-iawén:re' tewen'niáwe' tánon'
the date nine teen hundred and

ia:ia'k-niwáhsen tióhton shiiohseró:ten
six ty nine in the year of

kahwistasé'tsi sahatihwistaniión:ten'. On:wa'
new bell they hung the metal Now

they grouped together again and went back to Lake Champlain where the bell was buried and triumphantly brought it home. In due time it was installed in the church steeple. The bell served the village for many years.

A new bell was installed on June 15, 1969.



wenhniserá:te' ononhsatokenhtí:ke kanónhskon
 days in the holy house inside the house

oshon'kará:ke tká:ien' ne Deerfield aohwísta'.
 on the floor there it the Deerfield bell
 lies

Né tsakawehiahrakwén:nis tsi niiawén:'en ne
 it reminds us again what happened to

iehwista'ékstha' aoká:ra'
 one hits metal her story
 with it (bell)

Today you will find the old Deerfield bell resting on the floor inside the church to remind people of this history.

This story was told to me by my grandmother.

Warisó:se Kaierĩthon

Josephine Horne

SENHA' TEHOTI:KA TSI NI:IOT NE AKON:WARA'

Faster than O Face

O:nen kǐ' kwáh kén' niiohserá:ke tsi
now just some few years

náhe' kǐ:ken é' thó niiawén:'on. E' thó
ago this there it happened there
 thus

shikahá:wi' kontatewenní:io shé's ne katshé:nen'
as it carries their word then the animals
 was good

ne kahnawá:ke. Isi' nónhskwati she's niió:re'
the at rapids there beyond the used as it is
 bridge to be far

niekonnéhtha' ne teionnhónhskwaron. Awenhnisera-
they would the cows all day
 wander

kwé:kon enkontihón:take' ná:kon ne kwá:ti. Sok
long they would eat under the side then
 grass

shé's tentkonhtén:ti' nó:nen ienkáhewe' akonwati-
used they would come at the it would for one
to be back time carry to take

This happened some years ago when domestic animals were still free to roam in Caughnawaga. The cows used to pasture way on the other side of the bridge, on the east side, returning home twice each day to be milked,

non'tatáhkó' orhon'ké:ne tánon' ne nǎ' no'karaḥsnéha.
milk out of morning in and the in the
them evening

O:nen kǐ:ken shiwenhniserá:te' iáḥ
now this as this day not

tha'tetiawé:non kǐ:ken ne teionnhónhskwaron.
had she come this the cow
back

Iahonwanató:ri' ne tehniksá:'a iatate'kén:'a
they sent them the two boys they are
out brothers

aonsakonwaia'tisákha'. Iahniráthen' karistá:ke,
for them to go look they two on the iron
for her (body) climbed up

ia'thiatkathónnionhwe'. Tóka' akonwá:ken' ne
they looked around maybe she might the
be seen

raotitshé:nen' ka' ok nón:we aontaíora'kárhon'
their animal somewhere she might be
lagging

Kháre' ó:nen kǐ' ionsahiatsnenhte' ísi'
finally now just they two went over
back down there

ne ká:ti ákte'k nón:we ieshonatkén:se'.
the side every place they looked

morning and evening.

One day, this cow did not return home, so the family sent out their two sons to search for her. The boys went up on the railroad tracks and looked in every direction, but she was nowhere in sight. They climbed

Kháre' ó:nen tó:k niió:re' ná:kon ne ká:ti
finally now so as it is under the side

far

ia'thiatstikáhwha'. Iáh ki' tekonwá:ken ne
they traveled not just did they see the
her

raotitshé:nén'.
their animal

0:nen tontaiθ:karahwe' tahiatáhsawen'
now it got dark they started
 again

| | | |
|---------------------|-----------------------|---------|
| tontahia teristita' | tehotisteri henhatie' | ase'ken |
| they traveled on | they were hurrying | because |
| the iron | | |

| | | | |
|------------------|------------|---------|-------------|
| ronaterién:tare' | akón:wara' | ĩ:re's | nó:nen |
| they knew | O Face | he goes | at the time |

| | | | | |
|----------------|--------|-----|-------------|------------|
| entió:karahwe' | Kĩ:ken | ne | thakowá:nen | rattó:kas |
| it will get | this | the | he is large | he notices |
| dark | | | | |

rotatshatará:nis ok thé:nen' okwirokónhson'
 shadows appear something among the trees
 around him

nék tsi iáh wé:ne' tehaón:ni ase'kén tóhsa'
but that not showing he made on because not

down the other side of the tracks and hiked a great distance but she was nowhere to be found.

Darkness came upon them and they started for home following the railroad tracks back. They started to walk faster as darkness was descending upon them. They knew they had to be home before night was completely upon them

ahohterónhkwen' ne roken:'a. Kháre' ó:nen
 to frighten the his small finally now
 him brother

wahiaístó:ron'. Sók ó:ni' ne onstó:ren' ne kí:ken
 they two then also it began to the this
 walked fast walk fast

karhakónhson tetiotshatarátie's. Kháre' ó:nen
 in the forest shadowing finally now

wa'thiaráhtate' ó:nen ki' sénha' ákta' nonwéhte'
 they two ran now just more near it moved

ne notshá:ta'.
 the shadow

O:nen kí:ken ne thakowá:nen tahohterón:ne'.
 now this the he is larger he began to
 get scared as
 he came

Wahanonhtónnionhwe' tsi tóka' ó:nen ki' ne
 he thought that maybe now just the

akón:wara' shakoienáhsere'. E' thó ki' kí:ken
 O Face he is going to there just this
 catch them

for they knew that O Face lurked in the dark of night,
 ready to pounce on any youth who wandered about.

In the gloom, the older boy sensed a darker,
 gloomier shadow flitting among the trees in the distance.
 He did not let on to his little brother the fear that
 was growing within him. As the gloom grew more dense,
 he sensed the darker shadow of O Face flitting in among
 the trees and coming closer and closer. He urged his

ronahstoróntie' tsi nontaio'kara'onhátie'. E' thó
 they were as it was getting dark there
 walking fast

kí' ne akón:wara' sénha' aktóntie' nontahawe-
 just the O Face more near abouts he came

nonhtonhátie'. Kháre' ó:nen thó:ha ahshakonhóntera'ne'.
 along finally now almost would he catch up
 to them

O:nen thó:ha shahia'nikonhró:kten' waháttoke'
 now almost they came to the he noticed
 end of their minds

ne thakowá:nen ken'k niió:re' ne karhá:kon
 the his is large a bit so is it the in the woods
 far

tkaháhserote' tontahonerahóntsha' ne ro'kén:'a
 there a house he just grabbed the his small
 stands him by the wings brother

tánon' wa'thní:ten' tsi niiohsnó:re' iahianontátsnenhte'.
 and they flew as so it is they went down
 fast the hill

Iakén:'ak iahninhohó:ka'te' rotikstén:ha iatathróna'
 just barely they two reached they are old they are
 the door married

little brother to hurry and finally they were almost
 on the road home. The darkness swirled around and
 so did the shadow of O Face, closer and closer. The
 boys saw a small light glowing in the window of a
 house where lived an old couple. They broke into a
 run, with the dark figure of O Face starting to take
 swipes at them. With a last desperate burst of speed,
 they plunged right through the door of the cabin,

tsi thní:teron', raotinónhskon ia'thnihra'kwénhtara'ne'.
 there they two in their house they fell down on
 live their stomachs

Wahonatewerá:ienhte' ne akón:wara' kwáh
 a wind hit them the O Face just

iakén:'ak tonsahshakowíhskwahte'. Seréka'
 barely did he miss them almost

ahshakoié:nenwake'. Wahshakotihró:ri' ne iatathróna'
 would he catch them they told them the they are
 married

"Tsatera'swí:io kí:ken teseniiáhse, tsi
 your luck is this you two that
 good

iah tetshiseniié:nen ne akón:wara', ase'kén
 not has he caught the O Face because
 you two

iah ónhka' ne wén:ton tetsako'niakén:'en
 not anyone the ever have they escaped

tsi niiá:kon shakonhonterá:'on tsi niiohserá:kon
 as many people he has caught up as many years
 to them

falling to the floor before the startled eyes of the
 old man and the old woman. The terrible roaring,
 dark form of O Face took one last angry swipe at
 the door and all was quiet.

After the boys told their story, they were
 told how fortunate they were to escape, as in all

ahsontakóhson sha'tehotstikahwenhátie's."
in the as he is travelling along
darkness

the years that O Face had been known to travel in the
darknesses of earth, no one, but no one, had ever gotten
away once O Face had gotten hold of them.

Konwatsi'tsaién:ni

Rita Phillips



RONENHE:ION IAH TEHONTA:TI

The Dead Do Not Talk

Wahón:nise' iǎ:ken' kaná:takon rati'terón:-
long ago they say in town they lived

tahkwe' kaié:ri nihá:ti ronón:kwe, tehontero'seri-
then four of them men they used to be

ióhne'. Kháre' ó:nen ki wa'thonterihotárhoke',
good and then this they had an argument
friends

iáhken ónhka' ahohteron'níhake'. Shaiá:ta ki ne
not who he would be one man this the
afraid

rahtahkón:ni' wahatená:ieste' tsi iáh thé:nen'
he makes shoes he bragged that not anything

tehatshá:nis. O:nen ki' ne ronátia'ke ne
he fears now just the others the

rontén:ro' wahón:nehre' enhonwate'niéntenhste'
they are they thought they will test him
friends

Long ago, it has been told, in this town lived four men who were very good friends. One day they got to arguing as to who among them was the bravest. The shoemaker boasted that he, of all, was not, and never would be afraid of anything seen or unseen. The other three decided among themselves to give him a test.

oronhwí:io ken.
matter is if
good

Sók kí shaiǵ:ta thahrón:ni tsi wahrenhé:ie'.
then this one man he made as as he died

Shaiǵ:ta né:ne rahenheion'tahserón:nis wahshakaón:nien'
one man who he is an undertaker he made them

ne karón:to. Kwáh ki' tahatiié:rite' tsi
the casket so even they did it as
properly

wahonwaia'tá:ren' tánon' akwé:kon wahatiweienén:ta'ne'
they laid his and all they prepared
body out

tsi niioterihwíson'.
as the matter should be

O:nen ki tsi taió;karahwe' akwé:kon ki'
now this as it got dark all of

ne rontén:ro' wahatinonha'ǵ:na'. Wahonterihwah-
the they are they went to the they made a
friends wake

serón:ni' ne ki ne rahtahkǵn:nis ne é'
pact that this the he makes shoes that there

A few days later, the shoemaker was notified that one of his best friends was dead. One of the men, a funeral director, had made all the arrangements. The three remaining friends met at the wake and decided that one of them must remain with the dead man all night to

| | | |
|---------------|----------------|-----------------------|
| tenharhenhte' | enhatenón:na'. | Waharihwa'nón:wen'ne' |
| he will spend | he will watch | he agreed |
| the night | | |

| | | | | |
|------|-------------|--------|-------------|------------------|
| ki'. | Niá:rehkwe' | ki' | sahakóha' | raoio'ténhsera', |
| just | before | though | he went | his work |
| | | | back to get | |

| | | | | |
|--------|------|---------------|-----|---------------|
| tóhsa' | ki' | ahonónhtonke' | tsi | niwahsón:tes. |
| not | just | he would find | as | the length of |
| | | the time long | | the night |

0:nen ki' kwáh kén' shikahá:wi' tsi
now just just a bit as it carries that

| | | | |
|--------------|--------|---------------|--------------|
| niwahsón:tes | kí:ken | rahtahkón:ni' | renná:kahre' |
| as the night | this | he makes | he whistles |
| is long | | shoes | |

| | | | |
|------------|---------------|----------|-------|
| raonhá:'ak | rone'kón:re', | roió'te' | áhta |
| he alone | he hammers | he works | shoes |

shakwatákwás.
he repairs

[illegible]

watch. So, the shoemaker readily agreed to be the one, but first he returned to his shop to get a few things to work on during the night so that he would not find it so long.

When the shoemaker was alone with his "dead" friend, he set to work repairing the shoes he had brought, whistling as he hammered away.

"Hé, iáhken tesá:ien' ahserihwakwénnienhste'
 Hey! not do you you should respect
 have

ne iakawenhé:ion. Tha'tesató:tat."
 the they are dead Keep quiet

Ne rahtahkón:ni' wahén:ron',
 the he makes shoes he said

"Hé, énskak ó:nen enskonhró ri', serihó:kten.
 hey! once now I will tell shut up
 you again

O:nen nĩ:se' senhé:ion."
 now you you are dead

Sók ionsahatasónteren', sahrenná:kahre' tánon'
 then he continued he whistled again and

sahane'kón:reke'. Sók á:re' ki' ne raia'táhere'
 he hammered then again just the his body is
 some more laid out

tontahohén:rehte',
 he hollered again,

"Serihó:kten thĩ:ken. Tha'tesató:tat ó:nenk."
 shut up that you keep quiet right now

The shoemaker was getting a bit riled up by this time and said, impatiently,

"Hey you, I'm telling you for the last time, you keep quiet. You're the one that is dead."

Then for a while it was quiet again and the shoemaker returned to his hammering and whistling. Again the voice issued from the casket, this time much louder and demanding,

"Keep quiet. You have no respect for the dead.

O:nen ki' ne rahtahkón:nis tahoná:khwe'.
now just the he makes shoes he got mad

Tontahatá'stsi' tánon' karonto'tsherákta'
he stood up and near the casket
suddenly

nia'thá:ta'ne' tánon' ia'thohsó:kwe'ke'ne
he stood and he hit him on the
the head

raia'táhere'. Tonsahatkarhaté:ni', ionsahátien'
his body is he turned around he re-sat
laid out

tánon' sahoiío'ten skén:nen' tsi niió:re'
and he worked in peace as so it is far
again

wa'awén:te'ne'. Iáh nénska tha'tethowennaketó:ton'
daylight came not once did a word come out
from him

ne rawenhé:ion.
the he is dead

O:nen tontahón:ne' ne rontén:ro'
when they came the they are friends
back

Only a very stupid and crude man would do what you are doing in the presence of the dead!"

At this, the shoemaker angrily jumped up from his bench, bounded to the casket, and with his hammer, bopped the man in the casket on the head. After that, the shoemaker whistled and hammered in peace and quiet until the break of day. Not even one word issued from the dead man from then on.

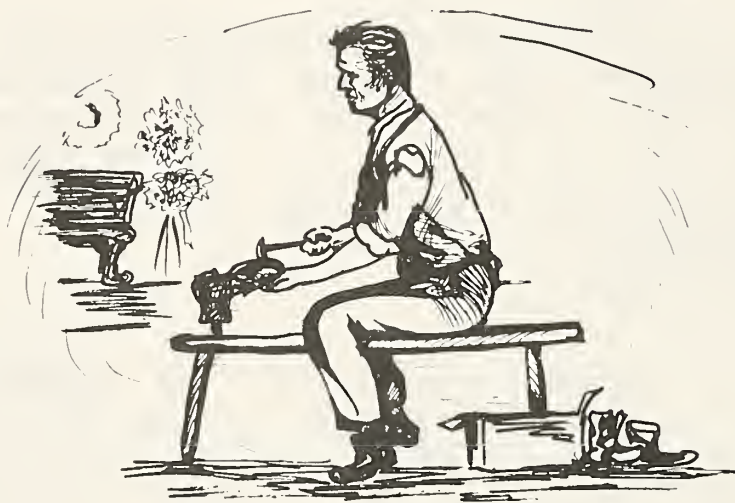
When his friends returned next morning, expecting

aonsahonwá:iehte' ne raoniheión:ta' tánon'
to wake him up the dead body and

aonsahshakokaratón:hahse' oh na'á:wen' tsi
for him to tell them what it happened as
stories

niwahsón:tes iah tehotikwénion aonsahonwawiéhton'.
as night is not were they able to wake him up
long

Iáh tha'tiesehshakowennará:ni ne rawenhé:ion rontén:ro'.
not a word did he speak the he is dead they are
to them friends



to be regaled by the story the "dead" man might tell.
He lay still and never said a word.

Konwatsi'tsaién:ni

Rita Phillips

ERHAR'O:KON
The Dogs

Wahón:nise' iá:ken' né:ne wa'tewatenón:ianihte'
Long ago it is said that it exaggerated itself

érhar wa'kontinákeren'ne' ne kaná:takon. Tánon'
dog they started to live the village in And

she's iá:ken' teionaterien'takária, ahsontakwekónhshon'
then it is said they were noisy all night, here, there

iotihní:hen. O:nen iá:ken' ne ranatakwe'ní:io'
they bark Now it is said the he is main town chief

waharihó:wanahte' tsi entá:'on ok nenkaié:ren'
he word made large that it must be something will be done

kí:ken érhar sótsi' wa'onatiohkowánha'ne'.
this dog too the groups became large

Wahontkennísa' ne ronón:kwe, tánon' wahati-
they met the men and they

rihwínton'te' tsi akwé:kon ki' entá:'on
word brought that all just it must be

A long time ago, there were a great many dogs in our small village. There were almost as many dogs as there were people. Everyone was getting very tired and impatient with them, because they were barking all night and getting into all kinds of mischief.

The chief called a big town meeting and the people decided that something had to be done. The people agreed, and the chief announced that all the dogs of the village

enkonwanahshéhton'.
they will be killed

O:nen kí:ken rokstén:ha í:non karhá:kon
Now this he is old far woods in

thanákere', iaharihwá:ronke' tsi nihontierá:ne'.
there he lives he word heard that what they are going
to do

Kwáh iá:ken' óksa'k tahahtén:ti', tahshako-
Just it is said quickly there he walked there he them

hroriá:na' tsi iáh tetkaié:ri' tsi nihontierá:ne'.
to tell came that not is it right that which they are
going to do

Wahshakohró:ri', wahén:ron', "Enkwahró:ri'
He them told he said I you will tell

tsi ionkhiia'takéhnhas thí:ken érhar. Sewa-
that they us help those dog You all

terién:tare' kí:ken kaniataratátie' tsi
know this river along there

ohniare'kó:wa kontí:teron', tánon' ne
snake big they live and the

were to be killed.

Now this wise, old man, who lived alone in the forest, heard what the people were about to do and he became very upset. He immediately started on a trip to the village to tell the people that what they were about to do was not right.

He told them, "You all know that there are horrible sea monsters living at the bottom of this river passing right by our village, and these monsters are constantly

teionatonhwentió:ni ne aontakontiráthen' kén:'en
they want the to climb up here here

kaná:takon akóntien'. Ne ká:ti' thǎ:ken
village in for them to The reason that
 stay

ahsontakwé:kon sewathón:te' érhar iotihnǎ:hen.
night all you all hear dog they bark

Skonwana'te'kwáhtha' ne ohniare'kó:wa, tóhsa'
they them chase back the snake large do not

atiá:kta' naontakón:ne'."
riverside for them to come

Tsi ó:nen waharihó:kten' ne rokstén:ha,
at when he word finished, the he is old

iah ónhka' thé:nen' tetiaká:wen tánon'
not anyone nothing did they say and

skennen'ahsón:'a sahonhtén:ti'. Iah ne wén:ton
peacefully they walked back Not ever

ónhka' tha'teskonwana'nikónhare' ne érhar.
anyone did they touch their minds the dog

trying to climb up the riverside to come into our village! Well, that noisy barking you hear all night is the dogs chasing back the monsters into the river. This is the reason we must keep our dogs and treat them kindly."

When the wise, old man finished, not a word was spoken, and the people quietly left to go home. The dogs were never again bothered by the people, and they were always treated kindly.

Né aorí:wa', shé:kon nón:wa' tho
 The reason still now there

niionkwanahskwaká:te' érhar ne kaná:takon.
 our pets are many dog the village in



That is why, even to this day, we still have
 a great many dogs in our village.

A:nen Kaia'titáhkhe'

Annette Jacobs

KASPÉ

Né:ne wahón:nise' shé:kon askwakaión:ne
this long ago still bridge old at

sha'teionskwí:ia'ks nón:kwe ó:nen iá:ken'
when they bridge people now it is said
crossed

kí:ken tontahonahtentionhá:tie' ken' nithotiión:sa
this back they coming little they aged young

skaniatará:ti na'tontahón:ne'.
beyond lake there they came

O:nen iá:ken' tahón:newe' tsi iotón:niate'
now it is said they came to end of point

ó:nen wahónttoke' ó:ia' ohná:ken' tahón:ne'.
now they noticed another back they coming

Sók ná:'a shaiá:ta wahén:ron',
then and one body he said

"Há'o kén:tho tewatáhset, eniethiia'tetshahníhten'
how here we hide we will intimidate them
about

thí:ken ohná:ken tahón:ne'."
those behind they are coming

Long ago, when people still crossed the old bridge,
it is said that several young men of the same age were
on their way home.

When they got to the Point, they noticed another
group behind them. One of them had an idea and said,
"Let's hide here and scare the group behind us."

Thó kǐ nahatǐ:iere'.
such then so they did

Wahón:nise' iá:ken' thó nón:we
long ago it is said there at that place

nishonókwen ronkwehkénha', Kaspé ronwá:iatskwe'.
they from man had been Gaspé he had been
water called
recovered

Thó kǐ' tsi karǐstote' thonwaia'táten'
there just at metal his body was put
standing in

O:nen kǐ ne thó shiwahsontá:te' thó
now this the there when night stood there

wahonteneró:kwaïen' wahonterhá:rate' ahón:newe'
they on their stomach they waited for them
lay to arrive

ne ronátia'ke tahón:ne'. Kháre' ó:nen ki'
the they others they are finally now just
coming

khé' ákta' rotihtharonnóntie' ne kǐ:ken ohná:ken'
close near they are talking the these behind
along

And so they did hide.

Long ago, it is said, they recovered a man's body. His name was Gaspé. There, by the marker, he was buried.

On that special night there they were hunched, patiently waiting for the group behind to get there. Finally, now, they were close by and they were speaking, this group that was behind.

tahón:ne'.
they were
coming

O:nen ki' thók nitió:re', ó:nen enwá:ton'
now finally only so it is far now it could
be done

enhsheién:tere'ne'. O:nen shaiá:ta ne rotahséhton
will you recognise now one body that he is hiding
someone

wa'thohén:rehte', wahén:ron',
he called he said,

"Tóhsa' ia'satkáhtho Kaspé tsi thaiá:ta."
do not there look Gaspé at where his
body is

Sok iá:ken' ki ronón:kwe tahontihéntho'
then it is said that the men they pulled out

wahonté:ko'.
they got away
hastily

O:nen ki' nen' né:'e ne kí:ken
now just as it is of this

ratineró:kwaie'n' wahónttoke' tsi niió:re' tsi
they are hunched they noticed as so it is far as

Now they were so close that you could recognise
them. Now one of the men hiding spoke loudly. He said,
"Do not behold Gaspé's grave."
Then, it is said, these men pulled out, they ran
away.
Now then, these men on the ground noticed the extent

ronateronhienhtén:ni kǐ:ken . ne. ronǝn:kwe
 for them blue has these the men
 fallen

ronate'kwenhátie'. Sok ne nen' né:'e tahonti-
 they hastily then they also it is they
 getting away

héntho' wahonté:ko'. Ne's kǎ:ti' ionsahiatkǎhtho'.
 pulled they got this verily back there they
 away hastily looked

Shé:kon kǎ:ti' ohná:ken' tá:re' ne Kaspé
 still verily behind he is coming the Gaspé

tahshakǝhsere'.
 he is chasing
 them

Né:'e kǎ:ti' ne' né:'e tho nǐ:iot tsi
 that verily this it is there is as so

wahshakotianerǝnhkwen' ne Kaspé ne thǝ
 he them had spooked him Gaspé the there

shikahǎ:wi'.
 as it carries.

Né:'e ki nen' né:'e ne wahǝn:nise'
 this that that it is that long ago

of their fear of these men in such hasty departure.
 Then they also pulled out and ran away. Now and again
 they would look back, only to see Gaspé coming behind
 them in pursuit.

Such is the way that Gaspé scared the fellows by
 materialising on that special night.

This is from the time when the old folks knew



ne shé:kon shihatikaraweientehténion' ne
the still when they knew stories they

khe'nihokón:'a séns thó ní:iot tsi
my fathers used such as it is such
to

ratiká:ratonhskwe'.
they used to tell
stories

Né:'e ki nen' né:'e ne akwiratékha'
this this parti- it is this sapling burning
cular

ronwá:iatskwe' ne kí:ken rakkaratón:ni.
he was called the this he me story told

how to tell stories. This is how my father and uncles
used to tell stories.

This particular one was told to me by my uncle
Burning Sapling.

Akwirá:'es
sapling tall

Frank Natawe

O'TONHKWA'

The Flame

Tóka' iá:ia'k-iawén:re' sha'tewakohseriiá:kon
about six teen as I years had passed

teiontiatieronnión:ni istén:'a tánon' í:'i
it made strange my mother and myself

shonsaiontiahtetionhátienne' énska shiwahsontá:te'.
as back we two were walking one as night stood

O:nen ki' kwáh kén' shitio'kará:'on tánon'
Now just even little as it darkens and

teiothahá:kton tsi nón:we niiákene'. Ok
it road curving at where we walk it

tieió:ken' she's tsi tionkwanónhsote' nó:nen
can be seen then at our house stood when

kanenna'ké:ne tánon' akwé:kon ionerahtén:'en.
autumn in and all leaves have fallen

Kwáh she's ki' ken'k nón:we thí tkahnho-
just then just where there door

ká:ronte'.
opening

My mother and I were walking home one moonlit night many years ago, when I was about sixteen. There was a little bend in the road where we were walking, and it was such a lovely fall evening, that you could see right through the trees to the back door of our house.

lonkenikaratóntie' ki' ná:'a, kháre' ó:nen
we two started along I suppose sudden then

ki istén:'a ia'ontkáhtho' tsi tionkwanóhnsote'
this my mother there she looked at where our house
stood

tánon' wa'í:ron',
and she said

"Oh nekén' kwah nón:wa' nithatiérha'
What ever now is he doing

thí:ken ia'níha?"
that your father.

O:nen ó:ni' ní:'i ia'katkáhtho'. Kén'
then also myself there I looked just

niken'tónhkwa' se'kén tsi tkahnhohká:ronte'
so small flame as well at door opening

skennen'ahsón:'a tsi teiohkwatasehátie'. Kwáh
slowly at it surrounding just

né:ne ónhka'k shi ok nahó:ten' tieken'eniónnions.
that someone what thing she examined

Iáh ki' thé:nen' teiontianonhtonniónhon',
not even anything did we think

My mother glanced up and suddenly said to me,
"I wonder what your father is doing?"

I followed her gaze to our back door and there,
going slowly around the frame of the door, was a small
flame, no bigger than a match flame. We thought that
my father was checking his work, as he had just finished

ase'kén thố roió'te'kwe' thetén:re' ne rake'níha.
 because there he had been yesterday the my father
 working

Tsi ó:nen ionsaiákenewe' wahunwari'wanón:tonhse'
 at when back there we she him asked
 arrived

oh nihatiérhahkwe' ne átste. Wahén:ron' ne'
 what he had been the outside He said it is
 doing

tsi iáh ne énska tiehoiakén:'en. Wa'akone-
 that not the one was he out she

khé:ren', nek tsi iáh ki' thé:nen' teiaká:wen.
 puzzled, but not even anything did she say.

Tsi wa'órhen'ne' wa'akorihó:ta'se' tsi
 at morning she received word that

thononhwáktani' ne ronwa'níha, sok óksa'k
 there he was the her father then immediately
 sick

wa'onhtén:ti'. Tho wá:'enhte' tsi thonónhsote'.
 she left there she went to where his
 house stands

hanging the storm door the day before.

When we arrived home, my mother asked him what he had been doing outside. He answered that he had not been out all evening. We looked quizically at one another, but did not think anymore of the incident.

The next morning my mother received the sad news that her father was very ill, so she quickly packed and left to go to his village. By the time she arrived

Sótsi' wa'ako'nísko', ok ná:'a shithawenhé:ion
 too she was late already then he had died

shiahá'onwe'. Saiakehiá:ra'ne' oh nahó:ten'
 when she she remembered what
 arrived

iontiatkáhthon, tánon' ó:nen ó:ni' wa'ako-
 we had seen and now too she

'nikonhriaién:ta'ne' tsi wa'akohshónnion'se'
 got on her mind that she bad omened

thí thó shiwahsontá:te'.
 that there as night stood



there, her father had already passed away. She immediately thought about the flame we saw on our way home the evening before, and she knew that it was one of those mysterious premonitions that people sometimes experience.

A:nen Kaia'titáhkhe'

Annette Jacobs

IAKOTINENIOIA'KS
The Legend of the Little People

O:nen ki' nī:'i nakká:ra'. Wahón:nise'
now here mine my story long ago

skahwatsī:ra onkwehón;we ronné'skwe' tíotkon
one family real people they used always
to roam

ronatonnháhere'. Kī:ken ne ronwa'niha
they were happy this the their father

ratoratsheraweiénhen iáh nowén:ton tehontónh-
he hunts well not ever are they

kária'ks ne raohwá:tsire'. Kī:ken ne
hungry the his family this the

shakoti'nisténha ieweiennī:io iakokhonniáhtskon
their mother she is a good she likes to cook
homemaker

tánon' tíotkon ionhkwennión:ni raonawenhshón:'a
and always she is making their clothes
clothes

kanéhon tánon' óhwhare' ióntstha', ne ó:ni'
skins and fur she uses the also

Once upon a time there was a very happy Indian family. The father was a good hunter and the mother worked very hard making clothes and blankets from the animal skins and using the meat for cooking nourishing meals.

iakonniǰ:tha' ne raonahsire'shǝn;'a.
she makes of this their blankets

Kaiǰ:ri nihotiwiǰ:raien'. Tseiǰ:ta ne řsi'
four that many they one child was far
children have

nǝn niiako'nikonhratshǰ:ni, Katsi'tsarǝ:roks
there so was she brave Gathering flowers

iontǰtiats. Ne kwǰh iakaon'ǰskwani kaniatarǰkta'
she was the just she likes along the
called water

aiǝntien', tiǝtkon nia'tǰ:kon ionnonhtonniǝnkwas
she would always many things she thinks about
sit

ne karihwǰ:io's naontǰ:we' nakohwatsǰ:rakon.
the good things it would to her family
come

Ia'akǝ:ta'we' se'kǝn nǝn:wa'. Akoserǝnhtakon
she fell asleep this time in her sleep

iakothǝn:te' rotǰhthare'. Ia'eiǰhtahkwe'.
she heard they were she awoke
talking

Taionnitskǝ:ten'. Ken' na'ǰ:iere' ken' rǝn:ne'
she sat up here so she did here they were
walking

There were four children in this family. They had one daughter whose name was Gathering Flowers. She had an adventurous nature. She used to love to sit by the river bank and dream of pleasant things for her and her family. One day she fell asleep on the river bank. She awoke to strange voices. Sitting up, she saw

Iahonwatihthárhahse' wa'í:ron', "Ká:ts kén
 she spoke to them she said come here

sewátien' tánon' sewatoríshen. Sewatonhkária'ks
 all sit and all of you you are all
 rest hungry

kén? Kana'tarokhón:we tánon' sewahió:wane'
 ? real bread and large fruit

wátien'. Kóh ísewak," tánon' wahonwatihné:kanonte'
 I have here all eat and she gave them a
 drink

ohné:kanos. Wa'í:ron', "Ka' nón nisewén:teron'?"
 water she said what place do all of you live

Wahní:ron' ne iatathróna', "A'é:ren
 they said the they are away over
 married there

onontohará:ke." Wahshakotihón:karon' aienatá:ra'
 on the hill they invited her she would visit

tsi nón thatí:teron'. Wa'onthon:tate'.
 at where they live she agreed

Sahón:ne' tsi sahonhten:ti', iahón:newe'
 they went to they went they arrived
 back home there

people, so she was not too alarmed.

She spoke to them, asking them to sit down and rest for awhile. She had a piece of corn bread and apples which she offered to her new found friends. She also gave them some cool water to drink. Gathering Flowers asked the little family where they lived, and they told her they lived yonder on a hill. They invited

tsi tkentstén:rote' kǐ:ken iakoneniǝia'ks
 at there stands this one throws stones
 a rock

rahsnonhsǝ:ke wahunitskerǝn:ti' tǝnon'
 on his hands he spit and

kentstenhrǝ:ke waharǝnie'. Thontaiawǝnhstsi'
 on the rock he rubbed all of a sudden

kén' nǐ:wa' tsi wa'tewateronhwén:tate'.
 bit a little it opened a crack

Ionsahontǝweia'te' raotinǝnhskon ne raohwǝ:tsire'.
 they went back in in their house the his family

Wa'f:ron', "Iǎh thǝontón' iakatǝweia'te'
 she said not is it for me to enter
 possible

sǝtsi' kén' niwǝ:'a tsi iontaweia'tǎhkhwa'."
 too small so is it where one uses it for entering

"Tǝ:ske' wǎhi'," wahén:ron' ne iakoneniǝia'ks.
 true eh he said the one throws stones

"Sonke'nikǝnhrrhen tsi skowǝ:nen nǐ:se'."
 my mind put down that you are big you

her to visit their home. She accepted their invitation
 and went along with them.

They came to a small rock and the little man spit
 on his hands and rubbed the rock with them. Suddenly
 the rock split open and his little family went through
 it into their home.

"I can't get through the tiny opening," said
 Gathering Flowers.

"Oh yes," said the little man. "I forgot about

Akohén:ton wa'thá:ta'ne' tánon' rahsnonhsá:ke
in front he stood up and on his hands
of her

wahonitskerón:ti', ienontsǐ:ne wahaíε:na'.
he spit on her head he held

Thontaiawénhstsi' wa'ónhstho'ne' tsi niio:re'
all of a sudden she got smaller as so it is far

tho ok nitsá:ka' tsi ni ne ronátia'ke
there so she was as the the the others
 small

O:nen ón:ton' ia'ontáweia'te'.
now she was she went in
 able

Kí:ken raotinónhskon ken'k nǐ:wa'
this in their house very it is small

atekhwá:ra, ani'tskwá:ra, kanakta'shón:'a
food is put seat is put places

kaké:ron', tánon' karíhstote' é' thó
it is laid and standing that there
out iron

you being bigger than we are."

He went over to her, spit on his hands, and rubbed her head. Suddenly she could feel herself getting smaller and smaller till finally she was the same size as the little people and was able to get through the tiny opening in the rock.

Inside the home was a tiny table and chairs, beds and a stove with a pot of soup on it. Gathering Flowers was invited to sit down and have some soup with

| | | |
|---------------|-------------|-------------|
| kana'tsáhere' | karihstá:ke | onón:tara'. |
| pot | on the iron | soup |

| | | |
|--------------------|-------------------|----------------|
| Wa'ontathón:karon' | Katsi'tsaró:roks | tahón:tonte', |
| they invited her | Gathering Flowers | they would eat |

Wa'enontararónnion' ne iakón:kwe iakorákwen,
she served the soup the woman she was serving

| | | | |
|-------------|--------|-----|-----------------|
| iakorákwen, | tánon' | íáh | tetewaterákwas |
| she was | and | not | was it emptying |
| serving | | | |

nonón:tara' . Iotena'tsátkon'.
the soup magic pot

0:nen ia'káhewe' ne Katsi'tsaró:roks
 now there it the Gathering Flowers
 carried

naonsaionhtén:ti', e' thó ionsaiontó:roke' tsi
she should go home that there she slipped in where

| | | |
|-------------------------|-------------|-----------------|
| teionitstenhrakháhsion. | Khé' thó | roia'ten'tón:ne |
| rock had separated in | right there | he was behind |
| two | | her |

ne rón:kwe kén' nihrá:'a, sahonitskerón:ti'
the man small so he was again he spit

them. The little mother kept taking soup out of the pot, but no matter how much she took from the pot, it remained full, as if it were a magic pot, which truly it was.

When it came time for Gathering Flowers to go home, she went through the narrow opening in the rock, the little man following her. He spit on his hands,

rahsnonhsá:ke tánon' ienontsf:ne iahaié;na'.
on his hands and on her head he touched

Thontaiawénhstsi' saiontehiá:ron' tsi nitia:kahskwe'.
All of a sudden she grew back to her regular
size

Wahén:ron' ne iakoneniθia'ks, "Enhske-
he said the one throws stones you will

rharátsten' tsi iáh ónhka' thahsehró:ri'
promise me that not anyone will you tell

tsi wahskwá:ken', tánon' tsi wahskwátho'
that you saw us and that you saw

tsi nón iakwén:teron'." E:so' shé:kon
that place we inhabit much again

saienatá:ra' tsi niwakénnhes.
she went back as the summer was
to visit long

Kanenna'ké:ne' ón:we', ia'káhewe' ne
Autumn it there it the
came carried

Katsi'tsaró:roks tánon' akohwá:tsire'
Gathering Flowers and her family

touched her head, and suddenly she grew back to her proper size. The little man made her promise not to tell a soul that she had seen or visited them. She came to visit them almost every day.

Autumn came, and it was time for Gathering Flowers and her family to move on to a new hunting

né:ne akhwá:tsire' tóhsa' nowén:ton aiakwa-
which my family not ever could

tonhkária'ke', tánon' ónhka' iakotohetstonhátie'
they hunger and anyone one passing by

aiakhinontará:nonte'. Tekeníhaton', kaská:neks
we would give them second one I wish for
soup

ne o'nikón:ra' ne tóhsa' nowén:ton ónhka'
the thought the not to ever anyone

akhe'nikonhráksa'te' ne akarihón:ni' tsi
would I cause their the would the that
thoughts to be bad reason be

nahó:ten' tkewenníneken's. Ahsénhaton', kaská:neks
what words I bring third one I wish for
out

akwé:kon nón:kwe enkhé:ken' ne tiók nahó:ten'
all people I will see the some thing
them

akatkáht'ho' ne ioiánere' tóhsa' akherihwa'tshén-
would I see the it is good not to would I find

nia'se'."
faults
with them

Wahén:ron' ne iakotineniódia'ks, "Akwe
he said the they throw stones All

she and her family would never be hungry and that she
might share the soup with any strangers who might come
their way. Her second wish was to have the wisdom not

ioiánere' nahó:ten' wahserá:ko'. Tsi nén:we'
 it is good what you chose to ever

enhsónnheke' tsi enhsatonnhá:rake', tánon'
 you will live that you will be happy and

ensatera'swiióhake'."
 your luck will be good



to hurt anyone with words that came out of her mouth. Her third wish was to be able to see something good in everyone she met and not to be critical.

The little man said, "You have made very wise choices. You shall be happy for the rest of your life."

Warisó:se Kaieríthon

Josephine Horne

At the Open Door

Wahɔn:nise' iǣ:ken', atsa:kta' ʌkta'
long ago they say near the near
 river

| | | |
|-------------------|--------|--------------------|
| tkanonhsɔːtahkwe' | é' thɔ | rati'terɔnːtahkwe' |
| there a house | there | they used to live |
| used to stand | | |

| | | | |
|-------------|--------|-----|-------------------|
| iatathrona' | tānon' | ne | ronwatiio'okōn:'a |
| they are | and | the | their children |
| married | | | |

| | |
|--------|--------------|
| tánon' | akokstén:ha. |
| and | she is old |

0:nen iɬ:ken' kɪ:ken sewahsɔn:ta
now they say this one night

| | | | |
|-----------------|-----|--------------|----------------|
| iahniia:ken'ne' | ne | iatathrona', | wahia terenna- |
| they two went | the | they are | they went to |
| out | | married | |

iénhna'. Akokstén:ha wa'ontenon:na'. O:nen ki'
church she is old she watched now just

kwáh kén' shikahá:wi' tahontahsawen' ne
some bit as it carries they started the

It has been told that long ago in a house near the river lived a couple, their children, and an old woman. One night, when the couple went out to church, they left the old woman to tend to the children. After some time of playing, the children became noisier and

ratiksa'okón:'a wa'thonterien'takáriahte'.
children they made noise

Ronatsharokwáhton ki' ná:'a tánon' ieshonaterí:io,
they were roaring I suppose and they were even
 fighting

ronatswá:ton tánon' ratitakhenóntie's. Kháre'
they fooled and they ran around Finally
 around

ó:nen wa'akononniá:ni' nakokstén:ha. Wa'aí:ron',
now she could not the she is old she said
 bear it

"Tha'tesewató:tat. Tóka' iáhten akón:wara'
you all keep quiet maybe not O Face

ientsisewaia'ténhawe'."
he will take your body
 away

Iáh ki' thé:nen' tehonatahonhsatá:ton.
not even anything did they prick their ears

Kháre' ó:nen thontaiawénhstsi' tahonwaniá:ra' ne
finally now all of a sudden she grabbed him the
 by the scruff
 of the neck

shaiá:ta ratákhe' ieia'tákta' shihotohetstonhátie'.
one boy he runs near her as he was passing
 body

noisier. They shouted, fooling around and running all over the place. After repeated warnings to quiet down, the children, of course, kept running around.

The old woman, losing patience, grabbed the first

Sok wa'tiakonhohón:ti' tha'akón:ni' iahonwaia'tón:ti'
 then she opened the door she made as she threw his
 body out

átste . Nek tsi tsók nahó:ten' awenhsá:takon
 outside but something in the fog
 (darkness)

tahoié:na' tánon' iahoia'ténhawe'. Iáh ne
 it grabbed and it carried his not
 him body away

wén:ton teshonwaia'tatshénrion ne raksá:'a.
 ever was his body found the boy
 again

one running past, which happened to be the littlest
 one, she jerked open the door and pretending to throw
 him out into the darkness, she yelled,

"Here, O Face, take him!"

And with a gush of wind the child disappeared
 into **the** fog, as if grabbed by an unseen force.
 He was never seen again.

Konwatsi'tsaién:ni

Rita Phillips



KANA'TAROKHON:WE
The Corn Bread

Nia'té:kon ne ó:nenhste' tsi nǎ tsi
many the corn as it is

iakoia'takénnhen nokwehón:we, iakoia'tahnǎ:rats
it helps them the real it makes their
people bodies strong

tsi niióhseres. Kǎ:ken oká:ra' ne tsi
at so the year this story is how
is long

niieiérhahkwe' aksótha nó:nen enienenhstóhare'
so she used my grand- when she will wash
to do mother corn

tánon' eniethé'serón:ni' ohén:ton' tsi niió:re'
and she will make before to so it is
flour far

kana'tarokhón:we eniena'tarǎsa'. Khwató:ken tsi
real bread she will finish still so
bread

nǎ tsi roné:ka's nón:wa' tahonatehiaróntie'.
this as they like now those growing up now

Kenkwité'stsi' aksótha eniahé:ron', ó:nen
in early spring Grandma she will say now

The corn had many missions for the Indians; it sustained them throughout the year. This is a story about my paternal grandmother and how she prepared the dry kernels of corn into flour and finally the end product, the corn bread.

ieióhe ahati'tarakarhátho'. Akwé tenhon'kenhrakwátho'.
time for them to plow all they will turn soil

tenietáhko' kahnenhshón:'a, káksakon eniakéta'
she will seeds in a dish she will
take out put in

tánon' entionkhĩ:ion' raktsĩ:'a khe'kén:'a
and she will give my older my younger
 us brother sister

tánon' ĩ:'i, enionkhihró:ri', "Kaié:ri tóka-
and me she will tell four maybe
 us

ni' wisk nikanénhstake iensewá:senhte' áhsen
 five kernels you will cause three
 to fall

niwahsĩ:take na'tekónteron'." E' thó ki'
feet number they are apart that there is what

na'kwá:iere'. Wakwahahoktanĩhon', raksótha tánon'
we did so we did row upon row my grand- and
 father

aksótha ohnā:ken' tá:ne' tahoti'rhoronhátie' tsi
my grand- behind they they are covering to
mother come

niió:re' eniakwáhsa'. Tsahia:kshera sok ná:'a
it is far we will one it crosses already
 finish

When spring came, every member of the family had a chore to do. We enjoyed working together. Grandma would have Father and my uncle plough the ground. They used a team of horses and a plough to get the ground ready for planting. Grandma would then carefully get out her seed corn, put it in a container, and hand it to my brother, sisters, and me. She would instruct us to drop four or five kernels every three feet. We did this, row upon row, with Grandma and Grandpa coming

eniotiké:tohte' kén' nikanerahté:son's tenkonta'ken-
 they will arrive just so we leave they will

hrótka'we'. E:so' tenkonwatíhsnie'ne' kháre'
 come through lots they will be cared until
 the ground for

ó:nen enkontehiá:ron' kwah skenén:'a tsi
 now they will grow just slowly as

enwatanenhistísa'.
 it will mature

Nó:nen kanenna'ké:ne é:n:wawe' enhén:ron'
 when autumn it will he will say
 arrive

raksótha, ó:nen iehióshe naienenhstaiénthó:ko'.
 my grand- now it is one will unplant the
 father time corn

Akwé tsi tkanenhistaiénthon ieniákwe' tánon'
 all to where the corn we will and
 is planted go

ieniakwahróhtenhte'. E' thó né' ó:nen
 we will take off ears then now

behind us with a hoe in their hands, covering the kernels of corn with the rich soil. In about a week's time we would see the tiny green blades come through the ground. After much care and nurturing they grew tall and stately and slowly matured with big ears of corn.

When autumn came, it was time to harvest the corn. We all went into the corn field to take the corn from

eniakwanoróhthsi'. Iah akwé thaiakwanoróhthsi'
 we will take off not all would we take the
 the husks husks off

kwáh nek tsi niió:re' iotenénhstate'. O:nen
 just only to so it is the end of now
 far the corn

ki' nen' né:'e enwá:ton' aksótha tánon'
 supposedly that it will my grand- and
 be done mother

raksótha enhniratskentón:ni', a'é:ren nikaronhkwahses
 my grand- they two will make way over so the chain
 father a braid there is long

tóka' tekeni-iawén:re' tókani' wisk-iawén:re'
 maybe twelve maybe fifteen

nikanonhkwén:take enhnihá:ren' naonstáthen'. Nó:nen
 so ears number they will for them to when
 hang them dry

akwé iostáthen nó:nenhste' sók nón:wa'
 all it is dry the corn then now

entsakwanenhstaron:ko'.
 we will take the corn
 off the cob

the stalks. We then husked the corn and left the husks at the base of the corn cob. We left the husks on for a purpose. Grandma, Grandpa, and my aunts would take the husks with the ears of corn and braid them into a long string, twelve to fifteen ears in each braid, then hang them up to dry. When the kernels were completely dry, it was time to take them off the cobs.

| | | | |
|--|--|---|--|
| O:nen
now | enwá:ton'
it is
possible | enienenhstōhare'.
she will wash
the corn | Kén'
here |
| niieiérha'
how she
does it | tsi ienenhstōhares,
that she washes the
corn | enion'kenhronta:ko'
she will take out
ashes | |
| karístakon
in iron | o'kén:ra'
ashes | né:ne
like | ioté:ken'
it burned
wahta'.
hard maple |
| Enienátsá:ren'
she will put
a pot on | karistá:ke
on the iron | ne
the | ohné:kanos
water
tánon'
and |
| wa'kenhrontákwen.
ashes taken from
the stove | O:nen
now | tentionekón:ti'
it will come
to a boil | ienenienhstá-
she will pour
corn |
| weron'
into | teniohnekón:ti'
it will boil | tsi
to | niiō:re'
so it is
far
nó:nenhste'
the corn |
| enkontia'tawitahsiōn:ko'.
they will take off their
coats | | Thō
then | ne'
now
ó:nen |
| eniehrá:ko'
she will
take away | karistá:ke,
on iron | tsi
to | kahionwatátie'
flowing creek |

The next step was cleaning and bleaching the kernels. This was done with ashes from the wood stove. It had to be ashes that were burned from hard maple trees. Grandma would put a measured amount of ashes and water into a large enamel cooking pot, bring it to a boil, then pour the corn into the boiling ash solution, then continue boiling it until the chaff and the tiny black hearts in each kernel were loosened. She would

ieniehawe' e' thó ienienenhstóhare'. Raksótha
 she will there she will clean my
 take it the corn grandfather

rona'tsakahrón:ton' e' thó ieniônweron' sok
 he has made holes there she will pour then
 in the pail

awén:ke ieniá:kohwe' kwáh skenén:'a
 in water she will put just slowly
 into to

teniehkarrhatenfhon' ia'otiiaken'enhátie' ne
 she turns back and it is going out the
 forth

kahnekáksen. Wakon'éskwani séns akheiatéró:roke'
 bad water I used to like then I would watch her

tekka:nere' iorihwanerá:kwa tsi niió:re' tsi
 I am seeing it is miraculous at so it is to
 far

ontenenhstóhare' kwáh otsí:nekwar neniá:wen'ne'.
 corn got so just yellow it happened
 clean

Akwé ne konnón:kwe séns kahiônwakon
 all the women used to in the creek

then take it off the wood stove, take it outside, and
 pour it into a galvanized pail with holes all over the
 sides and bottom. Most of the ash solution ran out so
 that only what was clinging to the corn in the pail
 remained to be cleaned. She then took the corn to the
 creek to wash away whatever was left on it. This was
 accomplished by putting the pail with the corn into
 the flowing creek and swishing it around until the fresh
 water flushed out the ash solution. I used to love to
 watch the corn turn clean and yellow before my eyes.

iekontinerhstóhares. Ne thố nốn shontakahá:wi'
they washed corn at that place as it carried

iáh ónhka' teiakoiéntahkwe' ohné:kanos ne
not anyone did they have water the

kanónhskon. Nố:nen wa'enenhstoharéhsi' sớk
in house the now she finished washing then
the corn

nón:wa' entsestátha'te'. Nố:nen kwah tokén:'en
next she will dry the now just thoroughly

enwastáthen' tsi nĩ ne óhstien', ó:nen enwá:ton'
it will dry so it the bone now it can

naie'the'serón:ni'.
one would make
flour

Raksótha shahahnĩ:non' ne kathe'serón:ni'
my grand- when he the it makes flour
father bought

tiotáhsawe' iakwaksa'okón:'a onkwaio'ténhsera'
it started we children our work

Most of the women took the corn to the creek for cleaning because we did not have indoor plumbing in those days; we had to draw water from the well. Then it was time to dry the corn. When the corn was dry as a bone, it was time to grind it into flour.

Up until the time we got a corn grinder, they used to have to pound the corn into flour. Now that we had the grinder it became the children's chore to grind the corn. The grinder was mounted on a very

ón:ton' naiakwathe'serón:ni'. Kĩ:ken kathe'serón:nis
 it we would make flour this it makes flour
 became

ká:tens oshón:kare' é' thó iora'nentǎ:kon
 thick board there it is stuck to

tánon' iokahkwén:tonte'. Ieniakwanenstáweron'
 and a wheel hanging we would pour corn in

sók teniakwatenníha'te' teniakwakarhaté:ni' ne'
 then we will take turns we will turn the the
 wheel

okahkwén:ta', ná:kon tkaksó:ron é' thó
 wheel under pan is placed there

ieiohnǎ:ote' othé:sera' tsi niió:re'
 it pours into flour till so it is far

eniakwǎhsa'.
 we finish

O:nen kathe'seríson', ó:nen enwǎ:ton'
 now flour is ready now it will be possible

eniena'tarón:ni'. Kén niieiérha'. Othé:sera',
 she will make here so she does flour
 bread it

strong, thick board with a large wheel attached to it.
 We put the corn into the feeder at the top and the
 flour flowed at the bottom to be caught in a large pan
 beneath the grinder. We took turns turning the wheel
 until we finished the amount that was portioned out to
 us to grind.

It was now ready for the end product. Grandma
 would take this flour, mix it with some cooked kidney

| | | | |
|---------------|------------------|--------|----------|
| onekwénhtara' | nikasahe'tɔ:ten, | tánon' | ostón:ha |
| red | type of beans . | and | a little |

| | | | |
|--------------|-----------|-------------|-----------------|
| tiohið:tsis, | káksakon | eniaké'ta', | teiohnekóntie's |
| salt | in a bowl | she will | boiling water |
| | | put in | |

| | | | | |
|---------------|------|---------------|------|----------|
| entiðnweron', | sok | tenionwénrie' | tsi | niið:re' |
| she will | then | she will stir | till | so it is |
| pour | | | | far |

| | | |
|------------------|--------------|--------------------------|
| tenkontatié:na'. | Ohnekanðhsne | ia'tenionnihsnónhsohwe'. |
| they have all | in the water | she will put her |
| blended together | | hands |

| | | |
|---------------------------|---------------|-----------|
| Eniontokwatsherótshenhte' | iehsnonhsæ:ke | enie:ren' |
| she will dip a spoon | on her hands | she will |
| into for some | | put |

| | | |
|----------------------|--------|---------------------|
| tenietakwénhtenhste' | tánon' | teniehwe'nón:ni, |
| she will flatten | and | she will shape into |
| | | a round |

| | | | |
|------------------|--------------|--------|------------------|
| tetiohnekóntie's | ieniaké'ta'. | Nó:nen | enwata:kerahwe', |
| boiling water | she will | when | it will come |
| | put into | | to the surface |

| | | | | | |
|------|----------|------|-------|------------|-----------------------|
| né | ken:ton' | tsi | ð:nen | wa'ká:ri'. | Ie'wahrakeri'tahstha' |
| that | it means | that | now | it is | one uses meat to |
| | | | | cooked | fry |

beans, and a bit of salt, and pour boiling water into the ingredients and stir it until blended. She would then dip her hands into cold water, spoon some of the batter into her hands, and shape the hot batter into round, thick, flat, shaped corn bread. She put it into boiling water, and when it came to the surface it was cooked. She served it with steak or venison and gravy

tókani' oskenón:ton enié:rihte' ne teniakwa-
or venison she will the we shall
perhaps fry

tatiéhsten' ne kana'tarokhón:we tánon' kén:ie
combine with the real bread and grease

entionkwá:ti' iawékon'.
we will pour it tastes good

Ne sha'kanénhsta iakwatstha' nó:nen
the same type we use the now
corn

eniakwatkatston' onénhsto. lah thé:nen' tekaiésha's
we make soup corn soup not anything goes to
waste

nó:nen kanenhstaienthókwen. Kí:ken onó:ra'
when the corn has been this husks
unplanted

kaiarowá:nen ronnéta'skwe', ratiksa'okón:'a thó
large bag they used the children there
to put into

rón:ratskwe', tánon' séns ratiratsken'tón:nis
they used to and also they used to braid
lay on

kéntskare' ionrahsi'tokewáhtha'. Kaia'tón:ni ó:ni'
rug he would wipe his made body also
feet on

over the corn bread. Corn soup is made from the same
type of corn. The corn bread and corn soup are still
in great demand, to this generation.

Nothing went to waste in those days; the husks

rononniá:thahkwe'. Shé:kon nón:wa' skehiá:ra's
they used to make still now I remember

akwé tsi niiakwahwatsí:ra' kató:ken nahó:ten'
all the of my family certain what

ionkwaio'tensherá:ien'. Ion'we:sen' she's ne' skathne tsi
we had jobs it used to be together that
pleasant

ionkwaió'te'.
we were working

were used to stuff mattresses for the children's beds, and
scatter mats were made by braiding the husks and
sewing them together. They made excellent mats for
wiping muddy feet on. The husks were also used to
make cornhusk dolls. I still remember how pleasant it
was when the whole family worked together.

Warisó:se Kaierfithon

Josephine Horne

AHTHEN:NO
The Lacrosse Ball

| | | |
|--------------|---------|--------------------|
| Wahón:nise's | iá:ken' | tehonhthénnokskwe' |
| long ago | it is | they played |
| | said | |

| | | |
|---------------|----------------------------|-----|
| tewa'á:raton. | Thihonaterien'tatshénrion' | tsi |
| Lacrosse | they invent a way | to |

| | | | | |
|-------------------------|------|------|---------|-------|
| ronahthenno'tsherón:ni. | Ne | sé's | iá:ken' | thi |
| they make balls | that | then | it is | there |
| | | | said | |

| | | | |
|------------|---------|---------------|--------|
| tsikónhses | kéntson | enkonwaié:na' | tánon' |
| the long | fish | they will | and |
| faced one | | catch her | |

| | | | |
|----------------------|-----------|-----|----------|
| enkonwania'tó:'ase'. | Ohén:ton' | tsi | niió:re' |
| they will slit her | before | as | so it is |
| throat | | | far |

| | | | |
|----------------|----------------|--------|-------------------|
| tenhatf:rihte' | ka'nionhsákta' | nón:we | nenhatikwé:taren' |
| they will | near the nose | the | where they will |
| break it up | | place | cut |

| | | | | |
|------|------|---------|-------|--------------------|
| kwáh | sé's | iá:ken' | né:ne | aiohnatirónhthake' |
| just | then | it is | this | it would be like |
| | | said | | rubber |

| | | | | |
|------|------|---------|-------|----------|
| kwáh | sé's | iá:ken' | ó:ni' | ostón:ha |
| just | then | it is | also | a little |
| | | said | | |

A long time ago they used to play Lacrosse. They had to invent a way to make a ball. To do this, they would first catch a sturgeon and slit its throat. Near the nose, there is a place which is just like rubber,

teiothwe'nón:ni ne eh nón:we. Ne ki' iá:ken'
it is round the there place the just it is said

enhatikwé:taren'. Ne énhontste' ne enhonhthenno'-
they will cut the they will use the they will use

tsherón:nia'te'. Tho niió:re' ó:nen onia'tará:'a
it to make there so it now cloth
their ball is far

tenhatihwawén:'eke'. Thók se's iá:ken' ní:iot
they will wrap it that then it is so it
said is

tsi ká:ien' ne wahón:nise' ne ahonten'nikonhró-
that this the long ago the they would have

ria'te'. Ne se's kí iá:ken' rónstha' ne
fun the then this it is said they used the



wahón:nise' tsi
long ago to

tehonhthenno'-
they would ball

óksthahkwe'.
play with it

and sort of round. This is where they would cut to make their ball. Then they would wrap this with a cloth. That was the only kind of toy they had, long ago. They used it to play Lacrosse.

Oróte' Karihwénhawe'

Sister Dorothy Ann Lazore

WAHSHAKOIA 'TAKEHNHA' RAOHWA;TSIRE'

The Boy Who Went for Help

Ne' thó nón shontakahá:wi' shé:kon
at this time as it carries yet

í:non sha'teionnonhshá:teron' wahotiténhta'ne'
far so their houses were they got poor
apart

ne onkwehón:we ase'kén ne' tho shiiohserá:te'
the real people because in there as that year

íáh é:so' teiokennó:ron sok ná:'a ki íáhten'
not much did it rain so then this no

tehotihetiióhse' nahonnonnhéhkwen' ase'kén akwé:kon
were crops good for them to live because all
for them on

ieiénthohskwe'.
they had planted

E' thó nón shontakahá:wi' akokstén:ha
then there as it carries she is old

At the time when the houses were still far apart, the Indians got very poor one year. There was no rain, so their crops were very bad, and they had little to live on that year.

It was at this time that an old woman who lived

ié;teron' iakothón:te' ónhka'k tiehnhonhtishons.
she lives she heard someone one is knocking

Ia'ontke'tó:ten', e' thó raksá:'a íthrate',
she looked out there boy he stands

Wahonwahnhohtónkwahse' aontahatáweia'te' wa'í;ron',
she opened the door for him for him to enter she said

"Takí:tenr na'teiaiwenhniseranón:iani
mercy on me it is such a horrible day

tánon' saiakenhátie', serihsión:ko ne
and you are out you take them the
off

sawenhshón:'a tánon' tstátha't."
your things and you dry them

Tahén:ron' ne raksá:'a, "Iáh tháon:ton'
he said back the boy not is it possible

ase'kén tewaksterihens iaonsá:kewe', istén:'a
because I am in a hurry I would my mother
return there

ionkehnha'onhátie'. Ahsathón:tate' ken aonsétene'
she is sending me would you be ? we two would
willing go back

alone heard someone knocking on her door. When she
looked out she saw a little boy standing out there.
She opened the door for him to enter, and said,

"Mercy, it is such a horrible day for you to be
out! Take your clothes off and dry them."

The boy replied, "It's impossible because I am
in a great hurry to return home. My mother sent me

enkatonrió:kten' tsi na'teionien'kwatã:se."
 I shall get out so the storm is bad
 of breath

Tahén:ron' ne raksá:'a, "I:'i
 he said the boy I
 back

enkonia'thahónnien'."
 I shall make a path
 for your body

Thó ne wa'ontatkwatã:ko' t̃anon' sahonwá-
 then the she got herself and she followed
 ready

hsere' ne raksá:'a. Wa'akonehr̃a:ko' tsi
 him the boy she was how
 back surprised

niwatié:sen' tsi nĩ tsi ĩ:ien' wa'onttoke'
 easy it was so it is she she noticed
 walks

tsi akwáh né:ne tekaniehtoht̃arhon tsi n̄on:we
 that just is was the snow had been at the
 removed place

nĩ:ien'.
 she is
 walking

The boy replied, "I shall make a path for you."
 The old woman then got ready to follow the boy.
 She was surprised at how easy it was for her to walk.
 She noticed that it was as if the snow had been removed
 from her path.



ionkwanonhwáktani'. Ahsen nón:ta' tsi náhe'
 we are sick three days so ago

wahshakwaia'táta' ne Ohserá:se."
 we buried his body the New Year

Wa'í:ron' ne akokstén:ha, "Oh káti'
 she said the she is old how is it

na'á:wen tsi né:'e rakihnnonksónhne'?"
 it happens that that one he came to get me

my son New Year."

The old woman said, "But how can that be, for
 he is the one who came to get me to help you."

Rake'níha rakkaratón:ni
 my father he has told me

Niioronhiá:'a

Mae Montour

SE'NIKON:RARAK
Watch Out

Tóhka' niiohserá:ke tsi náhe' éh
several so years so it goes thus
number

nikiawén:'en kí:ken kkaratón:ne'.
so it this I am going
happened to relate

Ake'nisténha ó:nen kwáh kén' náhe'
my mother now just a bit ago

ionkkaratón:ni. Kanátthen ne tsi kaná:taien'
she has told me uptown the at town lies

ia'teiaiakohahahiiia'konhákie'. Tha'kaké:ro'k iá:ken'
there she was crossing the suddenly it seems
street

ísi' na'oháhati iakothón:te' ónhka'k khe
over across the she heard someone just
there street

thontahohén:rehte',
he yelled right
at her

"Se'nikón:rarak wáts ensákwahte' thí
set your mind later it will get that
you

What I am going to relate took place several
years ago.

My mother told me that a while ago, she was
crossing the street in downtown Cornwall. All of a
sudden, she heard someone yell from across the street,

ká:sere ." Tánon' iá:ken' tontahohahahiia'konhákie'.
 it drags and it seems he was coming across
 the road

Tsi wa'thiátera'ne' ne ake'nisténha wa'é:ron',
 as they two met the my mother she said

"Iáh ki' ne ónhte' thé thaesewatkarón:ni."
 not even the at all not would it be a
 loss to you

O:nen iá:ken' kwáh kén' niió:re' sá:re'
 now it seems just a bit so it he was
 is far walking
 again

tontahohén:rehte' iá:ken' ahén:ron', "Ká:sere
 he yelled back it seems he said it drags

kí' wáhe' enkarihwén:ta'ne'."
 just certain- it will break to
 ly pieces

"Watch out for that car!"

The fellow who had issued the warning crossed the road, and as she met him, my mother replied, "If the car hit me, it would be no loss to you."

After he had walked on a bit, her protector turned and yelled back, "But the car would be demolished!"

Oróte' Karihwénhawe'

Sister Dorothy Ann Lazore

ATERO:SERA'
Friendship

Ne iá:ken' kɪ:ken tehnón:kwe, shaiá:ta
this it is this two men one male
 said body

Ahkwasahshró:non' tánon' shaiá:ta Kahnawa'ke-
resident of the and one male resident of
place of the body the place of
 partridge

hró:non' nes ne ronatén:ro' nek tsi
the fast they were but
water friends

teiotenonhianíhton tsi na'tehiataterihwanonhwéhne'.
it exaggerates itself that so they devised themselves
 a matter

Tiǝtkon ok nahó:ten' tiorihón:ni tehonatkénnion.
always some thing reason made they compete

Tetsá:ron rotinahskwaién:tahkwe' érhár,
both they animal owned dog

tánon' tiǝtkon she's ó:ni' né:'e
and both then also it was

Once there were two very good, but competitive friends. One was from St. Regis, and the other was from Caughnawaga. Not a day went by that they did not have a friendly argument about one thing or another. Every little thing was an excuse to top one another.

They were both the proud possessors of dogs, and each thought that his dog was much smarter and stronger

tehotirihwatí:ronte', ónhka' raotshé:nen' sénha'
 they word pulled who his pet more

ra'shátste'. Kháre' ó:nen wahiaterí:io' ne
 he is strong Sudden then they two fought the

raotitshé:nen' érhár. Sok wa'thní:ien', kwáh
 their two pets dog then they laid down even

wahnihwistá:ren'. O:nen ki enkató:ken'ne' ónhka'
 they two put now this it will show who
 money on

raotshé:nen' sénha' ra'shátste'.
 his pet more he is strong

Kwah iá:ken' nek ne wa'tewaniwharó:ko'
 Just it is said the fur came out

tsi na'thiatátienhte' ki érhár. Kwáh iáh
 so they beat each these dog even not
 other

thé:nen' tetiό:ken' ka' níká:ien' rotkwenionhátie'.
 anything there it which it lies he is winning
 was seen

than the other. One day the dogs had a fight, as dogs are prone to do. The two men thought that this was a fine time to find out which dog was really stronger. Each man was sure his dog would win, so sure in fact, that they made quite a big wager.

The dogs went at it so ferociously that fur was flying in every direction, and they raised such a cloud of dust that it was impossible to see which animal was winning. When all the dust had finally settled, all

Kháre' ki' ó:nen ia'tonson'kenhraién:ta'ne'.
 sudden but then dirt lay back down there

Kwáh iá:ken' nek ne otáhshon' o'kenhrá:ke
 just it is said only tails on dirt

skaké:ron'. Oksa'k ki' á:re' ne ronaté:n:ro'
 back they sudden again the they are friends
 were laying to each other

tonsahiatkén:ni' ka' niká:ien' sénha' í:ions
 again they two which it lays more it is long
 competed

tiotaté:n:ron.
 there it
 remains.



that was left lying on the ground were two tails. That should have ended the argument, but the two friends immediately measured to see which tail was longer.

A:nen Kaia'titáhke'

Annette Jacobs

RABAHBOT

The Bullheads

| | | | | |
|---------|--------------|-----|---------|------------|
| Tóhka' | niiohserá:ke | tsi | náhe' | sha'té:kon |
| several | so years | so | it goes | eight |
| | number | | | |

| | | | | |
|----------|-----------|-------------------|------|------------|
| nikón:ti | rabahbót | wahentsiahnǎ:non' | ki | rake'nǎha. |
| of them | bullheads | he bought fish | this | my father |

Atsia:kta' iahshakó'teron' tsi nōn:we
near the there he left them at the place
river

| | | |
|-----|-------|---------------|
| iáh | akwáh | tekiohnó:tes. |
| not | quite | is it deep |

| | | | |
|----------------|--------|-------------|--------|
| Tsiahiá:kshera | tó:wa' | entóhetste' | kĩ:ken |
| one week | maybe | it passed | this |

| | | | |
|--------------|-------|--------------|------------------|
| rakenonhã:'a | eh | tahahrārho'. | Ronehrakó:'on |
| my uncle | there | he pulled | he was surprised |
| | | up | |

| | | | | |
|---------|--------|------|------------------|--------|
| iá:ken' | kĩ:ken | tsi | nikanahskwĩ:io's | kĩ:ken |
| it is | this | that | so beautiful are | these |
| said | | | the animals | |

| | | | | | |
|-----------|--------|-----|-----|--------|------------------|
| kentsion. | Tanon' | ki' | ne | senha' | ieshonehrakɔ:'on |
| fish | and | all | the | more | he was surprised |

| | | | | | |
|------|------|----------|----------|-----|-----------|
| tsi | kwáh | akwé:kon | skáthne | tsi | nón:we |
| that | even | all | together | at | the place |

Several years ago my father bought eight small bullheads. He left them in a shallow pool in the river.

A week or so later my uncle pulled up to the dock and was amazed to see such beautiful fish. He was all

nikontí:teron'. Ok ó:ni' iá:ken' ná:'a iahohrión:ti'
 where they and also it is that he threw in
 live said his fishline

akwé:kon wahshakoié:na' ki rabahbót. Sha'té:kon
 all he caught them this bullheads eight

nikón:ti wahó:nawe'. Kwáh iá:ken' khé
 of them he caught right it is there
 there said

saháhkete' kí:ken rakenonhá:'a sahentsiahsheronniá:na'.
 he turned this my uncle he went back to fix
 back the fish

Ionsá:rawe' ki' óksa'k wahentsiahsherón:ni'
 he arrived just right he fixed the fish
 home away

tánon' wahentsiakerí:tahwe'. Tsi nahótsiarihse'
 and he fried the fish as his fish was
 fried

ki' kí:ken wahén:ron', "To ionkiatén:ro'
 just this he said to my friend

rinontsianontén:ra."
 I bring fish for
 him to eat

the more surprised to see them all together in the
 same spot. He threw his fishline right in and caught all
 eight bullheads, then returned home to prepare the fish.

At home he cleaned and fried them and, when they
 were ready, he decided to take them over to his friend
 as a special treat.

My father was mighty pleased. They were really
 digging in when he asked his friend where he had found
 such beautiful fish.

"Why, right here," replied my uncle. "Early this
 morning I pulled up to your dock and threw my fish hook

Otsta' iǎ:ken' ne' tsi nontahatshennón:ni'
 my gosh it that so he was happy
 seems

kǐ:ken rake'niha. O:nen iǎ:ken' tǝ:ske' tsi
 this my father now it is really that
 said

rotikhwátǝn' wahori'wanón:tonhse' ne ronatǝn:ro',
 they were he asked him the they are
 digging in friends

"Ka'" wahén:ron', "nón:we nontahsitsiǝnhawe'?"
 where he said place did you get the fish

Kǐ:ken rakenonhá:'a wahén:ron',
 this he is uncle to me he said,

"Satsiǎ:kta' orhon'kéhstsi takhrárho'. Tsi ki'
 near your early in the I pulled at just
 river morning up

nón:we thǐ:ken iah wi' sǝtsi' teiohnó:tes. Thó
 place there not so too is it deep there

iahonkwahrión:ti' wa'kahrióhkawine'. Thó," wahén:ron',
 I threw in my I fished there he said
 fish hook

"nǐ:iot tsi kontǐ:teron' tó:wa' shǐ:ken ónhka'k
 the way as they are as if someone
 placed

ǝh konwati'teron' rotenahskwarákwen."
 there he placed he kept them as
 them pets

into the shallows. These fish were just waiting for
 me, as if someone had set them in there as pets."



Wa'thohén:rehte' iá:ken' kǐ:ken rake'nǐha
 he burst out it is this my father
 laughing said

tánon' wahoíéshon'. "I:'i," wahén:ron', thǐ:ken
 and he smiled I he said that

akitshenen'ó:kon'. Tsiahiá:kshera tsi náhe' thó
 my pet one week ago there

tekhé'teron' í:'i wakatenahskwarákwen."
 I placed I I kept them as pets

My father burst out laughing. "These were my
 pets," he said. "I just set them in there a week ago."

Oróte' Karihwénhawe'

Sister Dorothy Ann Lazore

RAKSÓTHA RAOKA:RA'

My Grandfather's Story

Wahón:nise', Ahkwesáhsne iá:ken' éh
Long ago at place of it is said there
partridge

nitiawén:'en kí:ken nahó:ten' kkaratón:ne'.
there it this what I am going to
happened tell

Akohserá:ke éh niiawén:'en.
winter in there so it happened

Árok shiiotohétston ne "seaway"
not yet then it passed the Seaway

kawehnó:ton' she's thi ná:kon nekwá, kén'
islands stood then that under place just

nikawehnonhkwá:sa's. Raksótha raowenhkénha'
so islands small he to me to him used to
grandfather belong

énska kén' nikawehnóhkwa'. Kanonhsó:tahkwe'
one small so island house stood

ia:ken', tekaron'ta'serónnion', tánon' thó she's
it is said log on top of log and there then

A long time ago, before the Seaway passed through the reserve of St. Regis, there were many little islands on the St. Lawrence River at the north end of the reserve. These little islands were privately owned and my grandfather was the owner of one tiny little island. It had a huge pine tree, a dock, and a little log cabin. This

nón:we na'tehatĩ:ta'skwe' ne tehonatstekawhenhátie'.
place so they used to stop the they were travelling

Sewatié:ren tóhka' nón:ta', sewatié:ren nek ne
sometimes a few days sometimes only

sewahsón:ta enhonnón:wete'.
one night they will sleep

Iatathróna' iahá:newe' o'karahsnéha',
they married there they evening in
to each other arrived

iatonhkariá:khe' tánon' tehotihwihshenhé:ion.
they are hungry and they are tired

Oksa'k ne rón:kwe wahatsenhón:ni', tánon' ne
Quickly the man he made sparks and the

iakón:kwe taiontáhsawen' wa'ekhón:ni'.
woman she started she prepared food.

O:nen ki' shishonahtá:'on, wá:rehre' ne
then just when they were full he thought

rón:kwe óksa'k ki' ná:'a ne' ienharáthen',
man quickly I suppose that up he will climb

was mostly used by fishermen who wanted to stay a few days on the river or by travellers who wished to rest, sometimes just overnight, and sometimes for a few days.

One cold winter evening a travelling couple arrived at the island, weary and hungry. The man immediately started to make a fire and the lady began preparing some meat to cook. They enjoyed a quiet supper, and soon after, the man went upstairs to sleep.

enhotá:wha'. Ok ne iakón:kwe, khé:ken ne'
he will sleep but the woman instead it is

tonsaiakohtárho' niá:re'. Kwáh ki' thǎ:ken
she cleaned up meantime Just then that

kén' nikarǎ:wes ó:nen tiok nahó:ten'
small so matter now some thing
long

wa'akothón:te'ne'. Wa'akorihwaióha' oh nekén' kwáh
she heard she wondered what ever

nahó:ten', sok ia'eiá:ken'ne', ia'tiontkahthonniónhwe'.
what then out she went she looked around

Iáh ki' thé:nen' teiakotkáhthon. Tontaiontáweia'te'.
not at all anything did she see she came back in

Sok á:re' saiakothón:te'ne', kwáh né:ne tiók
Then again she heard as if some

na'kaia'tó:ten' shitaio:tská:honke'. O:nen se'kén
such kind of body as it would be now as well
eating

wa'ako'nikonhraién:ta'ne' tsi kanonhsohará:ke
she had her mind at on housetop

nontaiawenonhátie'. Skennen'ahsón:'a tsi ia'ieráthen',
it was coming slowly that up she climbed

The lady began cleaning up the supper dishes and was just about finished when she heard a strange sound. She was puzzled and stepped outside to see what it was. She couldn't see anything, so she came back into the house, and went back about her cleaning. Again, she heard this strange sound. It sounded like some animal was gnawing on something. Just about then she realized it was coming

thó iá:ken' ki "ráhskahn" tho'wahrá:kon ne
 there it is said that rahskahn he was meat eating the

rone'kénha'. Kwáh iá:ken' khe na'tontaieiá:ten'ne'
 her late just it is said she fell back down
 husband

tsi nikanekó:tes tsi niió:re' tsi wa'ako-
 that so ladder is that so it is that she
 long far

teronhiénhten', sok wa'tionráhtate' wa'onté:ko'.
 became scared then she ran she fled

Owisa'kéhson' nia'etákhe', shakóhsere' ne
 on ice here she ran he chasing her the
 and there along

"ráhskahn." Kwáh ki, iá:ken', ó:nen thó:ha
 Even it is said now almost

ahshakohóntera'ne' ó:nen wa'onhsá:kaienhthe'.
 would he catch her now she sounded her mouth

Kaná:takon niió:re' iahonathón:te'ne', sok
 village in so it is there they heard then
 far

from upstairs. It was like someone had thrown a pail of ice water on her, the way the hairs on her neck stood up. She slowly climbed the ladder and when she peeked into the room, she saw a "raskahn" eating the flesh from her husband's body. She became so frightened at what she saw, that she fell back down the length of the ladder, picked herself up and started to run, slipping and sliding across the ice!

The "raskahn" was right behind her when she gave a loud yell. The shout was so loud that they heard it miles away in the little village. They immediately

tontahskonaterahtá:na'.
they came to meet her

Saháhkete' ki' ne "ráhskahn," kwáh
back he just the rahskahn just
turned

iá:ken' nek ne wahén:ron',
it is but this he said,
said

"Wesani'taní:tenre' tsi iáh tekonié:na."
S--- pitied you that not have I held you



left to rescue her, for when the people hear that particular kind of yell, they know that the person is in trouble. When they reached the lady, the "raskahn" just turned back, shrugged his bony shoulders and sinisterly said, "You're darn lucky I didn't catch you."

A:nen Kaia'titáhkhe'

Annette Jacobs

OTHE:SERA
The Powder.

Kí:ken kkaratón:ne' rakenonhã:'a
this I am going my uncle
 to tell

rakkaratón:ni tsi na'thokerón:nion'se'. Tsi
he has told that a strange incident that
me the story happened to him

niwakénnehes kí:ken thó nihoia'tawén:'en.
during the this there so it happened to
summer him

"Orhon'kéhstsi'," wahén:ron', "wa'katkétsko"
early in the he said I got up
morning

ia'kiá:ken'ne' wá:kehre' enkhehnekanontén:ra' kí:ken
I went outside I thought I would water this

ohén:ton' tewaktsi'tsaiénthon. Kwáh," wahén:ron',
in front I had planted flowers just he said

"ó:nen iewakhnekonkiéhsere' wa'káttoke' tsi
now I was about to pour I noticed that
 the water

ok na'kaia'tó:ten' í:waks kí:ken tsi
some sort of it was this where
 animal eating

This is a story that my uncle related to me,
about a strange incident that happened to him during
the summer.

"Early one morning," he said, "I got up and went
outside, planning to water the flowers I had planted
in front of the house. Just as I was about to pour

waktsi'tsaienthóhseron. Oksa'k ớ:ni' wa'káttoke'
 I had planted flowers right also I noticed
 away

tsi tsiki'nhontstókhí' wahonwahehtaká:ri'." Kwáh
 that little blob-like they were destroy- just
 creatures ing the garden

iá:ken' skanó:ronks ahontekhwí:sa' kí:ken
 it is just about they would eat this
 said it all up

rotsi'tsiaiéntthon.
 he had planted
 flowers

Isi' na'ohahá:ti rén:teron' ronaté:ro'
 over on the other he lives they are
 there side of the friends
 road

wahohró:ri' ne wahén:ron', "Thí:ken ohnenna'tá:ke
 he told him this he said that on the potato

ronathe'serónkie's ne thó sá:ti."
 they pour powder on this there you throw it

Thó ki' iá:ken' nahá:iere'. Orhon'ké:ne
 that just they say he did it in the morning

the water, I noticed a particular kind of creature
 nibbling on all of my plants. Ants were destroying my
 garden, devouring everything."

A friend who lived across the road told him to
 pour a kind of powder on the root.

He did just that. The next morning he looked out

iá:ken' ionsahatke'tó:ten' kwáh iá:ken'
 they say he looked out again just it is said

ronatenekó:tote' kí:ken tsiki'nhontsókhi'. Nek
 they had set up this little blob-like just
 a ladder creatures

iá:ken' kí:ken rakenonhá:'a ne shotakiehsón:ton
 they this my uncle this he was smiling
 say to himself

sótsi' iá:ken' wa'thonwaren'kén:ni'.
 so it is had they tricked him
 much said

to see what had happened. Those ants had set up a
 ladder! My uncle could only smile to himself at how
 they had tricked him.

Oróte' Karihwénhawe'

Sister Dorothy Ann Lazore





RONTONHWENTSI:SAKS
The Expedition

Kí:ken oká:ra' né:ne tó:ske' kwáh
this story is of truly what

e' thó niiawén:'en. Raksótha ne kwáh é' thó
there it happened my grand- the what there
father

nihoia'tawén:'en. 1893 shiohseró:ten wahonwa-
it happened to him was the year they were

htíhnha'ne' ne Hudson Bay Co, raksótha tánon'
hired by the Hudson Bay Co my grand- and
father

áhsen nihotate'kén:shen' nahón:ne' tehniíáhse
three they are brothers they should two men
go

nirihstí:sere's nahshakotihahónnien' tánon'
they drag they will make the and
steel road for them

ahshakotihsníé:non' nahatirihstí:sere' kí:ken
they would help they would drag this
them the steel

onhwéntsase'. Othoré:ke nón:we niiawén:'en.
new land at the cold place so it happened

This is a true story about my maternal grandfather. The story I am about to tell happened in the year 1893. My grandfather and his brothers were hired by the Hudson Bay Company as Indian guides for the two surveyors who were to chart the land in the Northwest Territory.

Raksótha Rowí Sohé:rase' ronwáiatkwe', tánon'
my grand- Louie Sohe:rase' he was called and
father

Sakó, Wíshe, tánon' Kanenrahti:ron ronwatí-
Sako Mike and Kanenrahti:ron they were

iatskwe' ne rontate'ken'okón:'a. Kenkwitéhstsi'
called the they are brothers early spring

wahonhtén:ti' wahontonhwentsisákha', tióhton
they went they went to look for nine
away new land

niwenhní:take karhakonhkó:wa rón:ne's. Oná:ke
months numbered in the forest they were in canoe
walking

tánon' érhar iotikarenionhátie' ne raonawenshón:'a.
and dog they are bringing the their things

O:nen sha'tontahonahtentionhátie' nia'té:kon tsi
now as they were coming home many things that

nahotiia'tawénhseron'. Great Slave Lake konwá:iats
it happened to them Great Slave Lake it is called

tsi nón seréka' tahonatenonhianihtén:ni'.
at where almost tragic things happened to them

My grandfather's Indian name was Rowi Sohé:rase, and his brothers were Sakó, Wíshe, and Kanenrahti:ron. The expedition started in the spring. They were in the wilderness for nine months with canoes, dogs, and dogsleds as their mode of transportation. They were on their return trip when they ran into tragic circumstances. The tragedy occurred in Great Slave Lake.

| | | | |
|-------|-------------|---------|------------------|
| O:nen | akohserá:ke | ón:we' | ioweiennatshá:ni |
| now | mid winter | it | it was rough |
| | | arrived | |

| | | |
|-----------------------------|-----|------------------|
| tsi na'tkanien'kwataséhon', | iáh | thietsó:ken', |
| there it was a blizzard | not | was it clear |
| | | there any longer |

| | | | |
|-------------------|-------|-----|-----------------------|
| wahontia'táhton'. | O:nen | ni' | wahoná:karahwe' |
| they were lost | now | it | darkness fell on them |

| | | | |
|--------------------|-----|--------------|------|
| wahontenaktón:ni'. | Tsi | wa'órhen'ne' | akwé |
| they made their | at | following | all |
| beds | | day | |

| | | | |
|----------------|----------|---------------|-------------|
| raona'tóhsera' | óniehte' | tioterhó:ron, | soronhké:ne |
| their tent | snow | it covered | barely |

| | | | | |
|---------|------------------|--------|-----|----------------|
| ón:ton' | tahatiiá:ken'ne' | tánon' | ne | raotitshé:nen' |
| can it | they come out | and | the | their animals |

| | | | |
|-------|--------------------|--------------------|-------|
| érhar | wa'kontia'táhton'. | Raonatenná:tshera' | ó:nen |
| dog | they were lost | their food | now |

| | | | | |
|---------|--------|--------|-------|-----------------|
| ehtá:ke | ní:we' | kháre' | ó:nen | iahóntshahte'. |
| low | it is | until | now | it was all gone |

| | | | | |
|---------|---------|----------|------|-------------------|
| Tóhka' | nón:ta' | óniehte' | khók | rononnhéhkwen. |
| several | day | snow | only | they were staying |
| | | | | alive |

Winter had set in. It started to snow. The storm became so ferocious and cruel that they could see only a few feet away, and as a result they became lost. They put up camp for the night. The next morning, their camp was completely covered with snow and they had to dig their way out. The storm lasted for days. They lost their dogs and were now walking and pulling their equipment. Their food was starting to dwindle and they were now on rations until finally they had nothing left to eat.

| | | | | |
|------|------------------|-----|-------|----------------|
| Sakó | waha'wastará:ko' | ne | kén' | nika'wastésha. |
| Sako | he chose the | the | small | so the stick |
| | stick | | | is |

| | | | | |
|------|-------|-----|--------------------|--------|
| Kwáh | ĩ:ken | tsi | roti'nikonhráksens | tánon' |
| very | much | so | their minds were | and |
| | | | bad | |

tehoti'nikonhrahri': 'on tsi wahoná:karahwe'.
their minds were broken as night came upon them

their minds were broken as night came upon them

Tehniiáhse iatate'kén:'a ia'thotirihwaién:ta
two of them they are they set the matter
 brothers

| | | | |
|------|-------|---------|--------------------|
| tsi | énska | shé:kon | enshiate'nién:ten' |
| that | once | again | they will try |

| | | | | |
|---------------|--------------|-----|-------|-------------|
| nahiatorátha' | oskenón:ton. | Tsi | ĩ:ne' | tahonahsĩ:- |
| for them to | caribou | as | they | it crossed |
| go hunting | | | walk | |

| | | | |
|---------|-------------------|-------------|---------------|
| tia'ke' | wahkwari'tará:ken | raia'tá:ke, | wa'thá:ta'ne' |
| their | white bear | on his body | he stood up |
| feet | | | |

| | | | |
|--------|----------|----------------|--------------|
| kí:ken | ohkwá:ri | tekeniawén:re' | niwahsf:take |
| this | bear | twelve | feet number |

the short match. There was sadness and despair in the camp that night.

Two of the brothers decided to try once more to go out and hunt for caribou. As they were hunting, they tripped and fell over a white polar bear. The bear stood up. He was about twelve feet tall. When he

nihahnén:ies, wa'thatskára'we' kwáh né:ne
so he was tall he opened his just like
 mouth

o'tónhkwa' ne rahsa:kón. Tóhka nia'káienhte'
fire the in his several times number
 mouth

| | | | |
|------------------|-----|----------|--------------|
| nahonwarón:tate' | tsi | niiŋ:re' | iahrenheie'. |
| they shot him | to | so it is | he died |
| | | far | |

| | | | |
|--------|-----------------|------|--------------|
| Okša'k | sahiathroiḏ:na' | tsi | wa'konwario' |
| right | they went back | that | they killed |
| away | to tell | | it |

| | | | |
|-----------|-----------------------|------|------------------|
| ohkwá:ri. | Ronatshennonnihiátie' | tsi | wahoti'waraién:- |
| bear | they were happy | that | they got meat |

| | | | | | |
|--------|-----|-------|-----|------|---------------|
| ta'ne' | iah | o:nen | ne | Sakó | thahrénheie'. |
| | not | now | the | Sako | will he die |

| | | | |
|--------------------|-----|----------|----------------|
| Sakonwaia'tisákha' | ne | ohkwá:ri | sakonwaia'ta- |
| they went back to | the | bear | they could not |
| look for his body | | | find the body |

iðha', sok ná:'a akwé tioteniehtó:ron.
again then that all it was snow covered

opened his mouth, the inside of it looked like a ball of fire next to his huge white teeth. It took several shots to kill the bear. The two brothers were all excited. They quickly went back to the camp and happily reported to their comrades that they had killed a bear, and now Sakó would not have to be sacrificed.

By the time they got back to the spot where the bear had been killed, he was nowhere to be found, as the blinding snow storm had completely covered him up. The

Wahonnó'kwate' iáh tehotitshénrion ase'ken
they dug not did they find it because

tioia'tataríhen ne ohkwá:ri wa'kawistaná:wen'
its body was the bear ice became damp
warm

ne óniehte' kaia'tó:kon. Tewenhniserá:ke
the snow under its two days number
body

ronnókwas ó:nen shihon'nikonhró:ktha' ó:nen
they were now as their minds were now
digging running out

ní sakonwaia'tatshén:ri' ne ohkwá:ri.
this they found the body the bear
again

Wa'konwaiénsehre' sok wahati'wá:rarihte'. Tewenhniserá:-
they skinned it then they cooked meat two days

ke ohnekákeri khok wahatihnekí:ra' thó ne'
broth only they drank then the

ó:nen wahati'wá:rake', akwé wahotinonhwákten'
now they ate meat all they were sick

heat from his body had melted the snow beneath him and buried him still deeper. After two days of digging and no sight of the bear they were about to give up when they finally found the bear. They skinned him and cooked the meat. The first two days they only drank the broth, then they ate the meat. In the meantime, Kanenrahtí:ron's toes were all frozen and he could no longer walk. One by one they started to get sick

sótsi' io'wahráre'sen t̃anon' sótsi' karí:wes
 too meat is fat and too long matter

tsi náhe' tethonatská:honhkwe'. Kanenrahtí:ron
 at time they were eating Kanenrahti:ron

rahiakwirá:ke wakanennió:kwanoste' iáh téshre's.
 his toes on it froze not did he
 walk

O:nen ni wahón:newe' ne shakotiia'tí:saks
 now this they arrived the they sought their
 bodies

nahonwatiia'takéhnha', ionsahonwatiia'ténhawe' tsi
 they came to help they took their bodies to
 them back

nón thonatenatíson' ne Hudson Bay Company. Kaié:ri
 where they settled the Hudson Bay Company four

nihá:ti iosnó:re' sahón:newe' tsi nón
 of them it is fast they arrived at where
 back

ienakerénion' nón:kwe. Raksótha Rówı Shohé:rase',
 various people the my grand- Louie Shohe:rase'
 live people father

from eating the bear meat. They eventually all became
 ill as the meat was too rich for them after not having
 any nourishment for days. Help came, but none too soon.

They were finally rescued. They were all taken
 to the Hudson Bay Company fort. Four of the men
 returned to civilization that winter; the four were

rotiniákhon onónha' ó:ni' wa'kontiiésha'.
they are they also suffered hardship
married

Ronaterihwasherón:ni ne:ne Hudson Bay Company tsi
they made an arrange- that Hudson Bay Company that
ment

rotiniákhon enkonwatikária'kse' tsi nikari:wes
they are they will pay them as for time
married long

othore:ke iehón:ne's. Kî:ken ne Hudson Bay
at the cold they were this the Hudson Bay
there

Company ó:nen kwáh kén' náhe' iáh the:nen'
Company now just a bit time not anything

tehshonwatiwennahrónkha' wahonte'nikonhrî:sa' tsi
they did not hear their they made up their that
voice again minds

iáh tha'onsakonwatikária'kse' ne rotiniákhon.
not would they pay the they are
them again married

Wahonni:ron', iáh ó:nen tha'onshakwakária'kse',
they said not now would they pay them

accomplished, charting the Northwest Territory. The
wives of the men also went through great hardship.
There was an agreement made with the Hudson Bay Company
that as long as the explorers were away their pay would
come regularly to their wives. In the meantime, the
Hudson Bay Company had lost contact with the men and the
Company decided to cut off the payments to the wives.

"ase'kén iá:kwehre' thonenhé:ion."
because we think they are dead

Taioti 'nikɔn:ren'ne' tsi na'teiotenonhianɪhton
their minds fell that it was so terrible

nahó:ten' wa'konwatihró:ri'. Oh nenkontiié:re'
what they told them what will they do

σ:nen wa'onátia'kse' tsi kontihwistatahkwas.
now it was severed the they were taking money out

| | | |
|------|--------------------|------------------------|
| Akwé | nieiotiwiraién:ton | taiakotĩhsnie'ne'. |
| all | they have children | they should look after |

| | | | |
|---------|-------|-----------------------|----------|
| Aksótha | ahsen | niiakówiraiɛn:tahkwe' | isten:'a |
| Grandma | three | she had that many | mother |
| | | children | |

| | | | | |
|---------------|------------|------------|--------|-----|
| shiiewirɔ:'a. | Kon'tatie' | iakoiɔ'te' | tanon' | ɬ:k |
| when she was | all day | she is | and | so |
| a baby | | working | | |

| | | | | |
|----------------|-------------|------------|-------------|----|
| nitio'karā:'on | otsinehtara | iakoiθ'te' | skā:ti | ne |
| as the night | beads | she works | one side of | |

| | | | |
|--------------|-------------------|-----------|------|
| ionhsi'tá:ke | teiontatkarén:ron | owirá:'a. | Tsi |
| on her foot | she is rocking | baby | what |

They told the women they could no longer pay them as they thought the men had perished.

It was a horrible shock to the women to be told that their husbands were given up as dead and that their means of support was severed. They all had young children to support. My grandmother had three children to support; my mother was a mere babe in arms. Grandma had to work all day and late into the night, one foot rocking the cradle, while she did bead work. She would

| | | | |
|-----------|----------|-----------------|----------------|
| nahó:ten' | eniéhsa' | kaio'ténhshera' | teniontá:ton', |
| ever | she will | beadwork | she will |
| | finish | | exchange |

| | | | | |
|----------------|--------|-----|-------------|-----------|
| atenná:tshera' | tánon' | ne | karístakon | nahó:ten' |
| food | and | the | inside iron | what |

| | | | |
|--------------|-----------------------|-----------|-----|
| aionté:kate' | nahotiia'tatarĩ:hen', | iakén:'ak | tsi |
| for her to | for their bodies to | barely | to |
| burn | keep warm | | |

ronnónnhe'.
they live

| | | | | |
|--------------|-----|-------|----------|-----|
| Ontsharó:ko' | tsi | ó:nen | sá:newe' | ne |
| chattering | for | now | they | the |
| | | | returned | |

| | | | | |
|----------------|------|-----|------------------|--------|
| iatate'kén:'a, | Akwé | ne | rontátenonhkwe' | tánon' |
| they are | all | the | they are related | and |
| brothers | | | | |

| | | |
|-------------------|-----------------|-----------------|
| ronatenro'shón:'a | ronatshennón:ni | ronatonnháhere' |
| their friends | they are glad | they are happy |

| | | | |
|------|----------|-----|--------------------|
| tsi | sá:newe' | ne | iatonhwentsĩ:saks. |
| that | they | the | they search for |
| | returned | | land |

exchange the beadwork for food and fuel, barely staying alive.

What a happy day it was when the men returned home. All the relatives and friends were there to welcome the explorers back home again.

Warisó:se Kaierĩthon

Josephine Horne

TSITHA
The Bird

Ne iá:ken' kǐ:ken ranekénhteron'
this it is this he is young
said

ionsahatáweia'te' tsi thonónhsote' wahori'wanón:-
he went back into at where his he asked
his home house stands

tonhse' ne ro'nǎha aón:ton' kén ne
the his ? the
father

aho'seréhtani'. "I:kehre' akaterohrókha' kǐ:ken
would he lend I want I would go this
it drags watch

teióia'aks."
it flickers

Wahén:ron' iá:ken' ne ro'nǎha, "Wá:s,
he said they say the his go
father ahead

nek ki' ná:'a ne enhsaten'nikón:raren'. Tóhsa'"
but just that the you will set your mind do not
on it

wahén:ron', "nón:wa' enhse'niakenhtánion'."
he said this will you speed around
time

Once a young boy returned home and asked his father whether he would be willing to lend him the family car, so that he could go to the movies. His father said, "Go ahead, but take good care of it and don't go speeding around."

Sahén:ron' iá:ken' kí:ken ranekénhteron',
 he said it is this he is young
 back said

"Enkaten'nikón:raren'se'."
 I shall set my mind on it

Orhon'ké:ne iá:ken' saharihwá:ronke' ne
 in the morning it is he heard the
 said

ro'níha ákte'k nón:we iehshohonwí:sere's tánon'
 his every place he was driving and
 father around

ákte'k ó:ni' nón:we ronwá:kens tethoke'tóhton.
 every also place people were coming out
 seeing him

Ohstón:ha iá:ken' ó:ni' tsi ní:iot nahorihwáksha'se'
 a little it is also so it is he was angry
 said

ne ro'níha. Thók shé' ní:iot tsi
 the his the only so as
 father

ronaterihwahsherón:ni tsi thók nón:we
 they had made plans so just that place

"I'll be careful," answered the boy.

The next morning the father heard of his son's adventures during the previous evening. People had seen him driving all over. He was somewhat angry. They had agreed that he would only go to the movies. He said

ienhakwátho' kǐ:ken teioia'áksne.
he will go this it flashes

Iáh ó:ni' óksa'k the tehá:wen kǐ
not also right not did he this
 away speak

ro'niha. Tohkára' nón:ta' ontóhetste'.
his several days it went by
father

Ronwaia'tanontaktónhne o'karaḥsnéha shonsá:rawe'
Friday in the evening when he
 arrived

ne roién:'a sahorí'wanón:tonhse' ne ro'niha
the his he asked him again the his
 son father

enhathón:tate' ken shé:kon ne aonsaho'seréhtani'.
will he be ? again the he would lend him
willing it drags

Thó ki' niió:re' ó:nen wahorí'wanón:tonhse'
at that so it is now he asked him
 far

ne roién:'a tó:ske' ken ki oh nahó:ten'
the his son it is ? this what thing
 true

rarihwahrónkha'.
he is hearing about

nothing, and several days passed.

The following Friday evening the son again returned home and again asked to borrow the car. At that point the father asked whether what he had heard were true.

Wahén:ron' iá:ken' ki roién:'a, "Tó:ka'."
 he said they this his son I don't
 say know

Sahén:ron' ne ro'níha, "Wa'kerihwá:ronke"
 he said the his I heard
 back father

thí tóhka' niwahshontá:te' tsi náhe'
 that several night ago

kon'serehtanihén:ne' tsi sa'niaken'én:ne',
 I lent you it drags that you went all
 over the place

akté:shon' iá:ken' nón:we nonkwehshón:'a
 every other it is place people
 place said

iesá:ken's tetisake'tóhton'."
 they were you were appearing
 seeing you from everywhere

Wahén:ron' iá:ken' kî:ken roién:'a,
 he said it is this his son
 said

"Hónhka' ne' ne rá:ton'?"
 who was it who he is saying

Ranonhtonniónkwas iá:ken' kî:ken ro'níha
 he was thinking it is this his father
 said

His son told him that he did not know.

"I heard that several nights ago when I lent you
 the car, you drove around all over the place, and people
 saw you everywhere."

The son asked who had said such a thing.



thó niió:re' ó:nen iahén:ron', "Tsítha wahakhró:ri'."
 there so it now he said bird he told me
 is far there

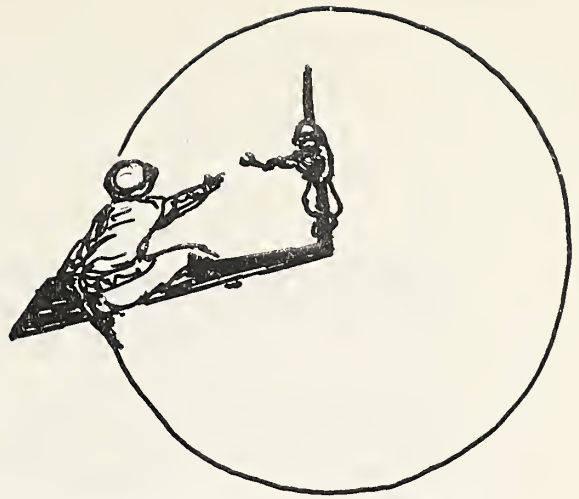
Ia'tehononhsonhtiia'konhátie' iá:ken' ki roiená:'a.
 he was going into the other it is this his son
 room said

Kwáh ó:nen ranhotón:ne wahén:ron', "Ronó:wen kí'."
 just now he was clos- he said he lies just
 ing the door

"A bird told me," replied the father.
 The son went into the next room, but just as he
 was closing the door, he said, "That bird sure knows
 how to lie, then."

Oróte' Karihwénhawe'

Sister Dorothy Ann Lazore



KA;R NAHSONTHEN

11:45 P.M.

Ká'tsi ok nón:we kí:ken kanón:no karĩstatsi
some place this New York ironwork
City

thotiió'tehkwe' tóhka' nihá:ti kahnawakehró:non'
they were a few of them residents of the
working place at the rapids

tánon' shaiá:ta ne ahkwesahshró:non' ostón:ha
and one man the resident of the a bit
place of partridge

tethona:kara's. Shaiá:ta ó:ni' iá:ken' ne
he was dark one man also they say the

rahón:tsi skáthne thonatoróhon ronkwe:tase'.
he is black together they partnered a new man

Ne ki' kí:ken ahkwesahshró:non' thé:nen'
Well just this St. Regis man something

ki' ná:'a iahori'wanón:tonhse' aontahó:ion' ne
I guess he asked for would he give the
him

There is this story of a few guys working on steel somewhere in New York City. A couple of them were from Caughnawaga, and one from St. Regis who was a bit on the dark side. A new guy was also working in the gang who was a black man.

The St. Regis man asked the black man to give him

rahón:tsi. Sok iá:ken' wahén:ron' tó:k
he is black then they say he said such

na'tehawennakaré:ni,
so his voice was loud,

"Niá:wen kí' ahsónthen."
Thanks midnight

Khé ki' niiohsnó:re' wa'tharihwaserá:ko' ne
right just as it is he answered back the
fast

rahón:tsi,
he is black

"Iáh tekarií:wa', ákta' ki'k ní:se' ne
not a matter near this yourself the

ká:r nahsónthen nihsia'tó:ten."
quarter midnight such you are
a kind of

something and as he was handed it, he said,
"Thanks, Midnight!" to which the black man
promptly replied,
"You're welcome; you're pretty near quarter to
midnight yourself!"

Konwatsi'tsaién:ni

Rita Phillips

TSIK A TSIK, TSIK A TSIK, TSIK A TSIK

[illegible]

| | | | |
|----------------------|--------|--------------------|--------|
| wáhiatonhká'ria'ke', | tánon' | wahiatienhtó:kten' | ó:ni'. |
| they two hungered | and | they two were out | too |
| | | of wood | |

[illegible]

| | | | | |
|--------|-----------------|-----|----------|--------|
| tánon' | wahshakohró:ri' | ne | ró:ne' | tóhsa' |
| and | he her told | the | his wife | do not |

aionté:ka'te' tsik énsdrawe'.
for her it to until will back
burn cause he come

Iáh teiakotahonhsatá:ton, kanĩ:io'k
Not did she her hears prick as soon as

| | | | | |
|----------------|------|-----------------|--------|--------|
| iahaia:ken'ne' | sok | wa'etsenhón:ni' | tánon' | sótsi' |
| out he went | then | she sparks made | and | too |

One long and cold winter, a man and his wife ran out of food, and had very little firewood left. The husband got ready to go out on a hunt, and he told his wife not to make a fire and use up the wood until he returned with meat to cook.

Now the wife was very cold and very hungry. She did not listen to her husband, and instead started a fire the minute he left. She stood warming herself

ákta' niahá:'en' tsi iotékha' wa'onnihsnonhsótshi'
near she went at it burns she her finger scorched

Wa'tiakohén:rehte' ki' ná:'a tánon' wa'ako-
she yelled I suppose and she her

'tsí:reke' ne iehsnonhsá:ke. Tsi niió:re' tsi
finger sucked the her finger on As so it is far as

iontonhkária'ks, wa'akawé:ka'we' sekén ne
she hungry taste pleased her as well the

iehsonhsá:ke tánon' wá:'eke', wá:'eke' ó:ni'
her finger on and she ate it she ate it also

ne ienentshá:ke, tánon' ne ieia'tá:ke, tánon'
the her arm on and the her body on and

ne iehsiná:ke, akwé:kon ne ionhsi'tá:ke.
the her leg on all the her feet on

Kwáh iá:ken' wa'ako'tsirékhon' ne ionhiakwirá:ke.
Even it is said she sucked the her toes on

O:nen ki iá:ken' kwáh iah thé:nen'
Now this it is said just not anything

tetsako'wá:rare', tánon' shé:kon niiontonhkária'ks
meat on her and still so she hungered

next to the fire, when she accidentally burned her finger. "Aki:'i," she yelled and stuck her finger in her mouth to try and ease the pain. She was so hungry that she discovered her burned finger tasted good, so she nibbled at it until she had eaten it all up. Then she burned her hand, and ate it, burned her arms and ate them, burned her body and ate it, burned her legs and ate them, even burned her toes and sucked and sucked on them! The lady ate herself all up, and did not have a speck of meat left on her

Wahén:ron' ne rokstén:ha, "Thí kawenní:io'
 he said the he is old this word is good

entá:'on ki' niáhkwe' enhsahiákha' tánon'
 it will be just meantime you will and
 necessary berry pick

enhsanitsatorátha' tánon' kén:'en nentéhshawe'."
 will you fish to and here will you bring
 hunt go

Thó ki' nahá:iere' ne rón:kwe. Wa'thosterihen'
 there just there he the man he hurried
 went

ki' ná:'a, ó:nen she'á:re' sahothón:te'ne'
 I suppose now again again to his
 ears it came

"tsik a tsik, tsik a tsik, tsik a tsik" taiohstien'takaré:re'.
 noisy bones coming

Tahó:ion' ne káhi, tánon' ne kéntson,
 he him the fruit and the fish
 gave

sok ne rokstén:ha wa'tatia'karatirón:ten' tánon'
 then the he is old he his body stretched and

told him, "First you must pick me some berries and catch me some fish." The man raced around picking berries and catching fish, and in no time at all he had a big basket of berries and a long string of fish. Again, in the distance, he heard the strange sound coming closer, "chick a chick, chick a chick, chick a chick." He ran even faster back to the house.

The little man said, "Come with me." They stood at the edge of the canyon. The little man stretched

wahatatia'tahní:rate', sok raia'tá:ke wahahtén:ti'
 he his body hard made then his body on he went

ne rón:kwe wa'thaiá:ia'ke'. lahá:rawe' ki
 the man he crossed he arrived that

ne ísi' nekwá ne rón:kwe, ok ná:'a ne
 the over place the man then the
 there

rokstén:ha sahatatáhsthohte' tánon' kanónhskon
 he is old back he himself and house in
 small made

nionsá:re'.
 there back
 he went

Ken'k nikarí:wes kanónhskon iéshre's, sok
 just a so matter house in there back then
 little long he went

wahothón:te'ne' "tsik a tsik, tsik a tsik, tsik a tsik."
 it to his ears
 came

Aktóntie' nontaiawenonhátie'. Kháre' ó:nen kwáh
 closer it was coming sudden now just

himself and made himself hard and stiff, so that the
 man and his dog were able to walk on his back and get
 safely to the other side. Then, the little old man
 made himself normal and went back into his house.

A short time later, the little man heard a weird
 sound in the distance, getting louder and louder!
 "Chick a chick, chick a chick, chick a chick." Finally
 the sound was right outside his door. There was a loud

átste tho taiorá:kahre'. Iahahnhotón:ko'. Thó
outside there there noise He door opened there

í:tsete' kí:ken iakón:kwe iah thé:nen'
she this lady not anything
standing

teiako'wá:rare'.
meat on her

Wa'í:ron' "Taki'terónhna' ísi' nekwá."
she said place me over there

Wahén:ron' ne rokstén:ha "Thí kawenní:io',
he said the he is old that good word

entá:'on ki' niáhkwe' enhsahiákha' tánon'
it will be just meantime will you and
necessary berry pick

enhsanitsatorátha' tánon' kén:'en nentéhshawe'.
will you fish to and here will you bring
hunt go them

Iah teiakothontá:ton, wa'í:ron', "Iah
not did it to her come she said not

tewakenáktote' kwáh óksa'k taki'terónhna'.
does place stand just fast place me there
for me

pounding on the door, and when he opened it, there stood
the lady without a speck of meat on her bones.

She demanded, "Take me across the canyon." The
little old man agreed, but told her,

"First you must pick me some berries and catch me
some fish."

"I have no time," she said, "Take me across
immediately!" she angrily answered him.

Sok ki ne rokstén:ha wa'thatia'karatirón:ten'
Then this the he is old he his body stretched

tánon' raia'tá:ke wa'onhtén:ti' ne iakón:kwe,
and his body on she walked the lady

nek tsi iah tieiá:ko ne ísi' nekwá, sótsi'
but not did she the over there too
go

wahatatia'tahnhétskwahte', wa'ekháhen', tánon'
he his body soft made she slipped and

ia'eiá:ten'ne'. Iáh ne wén:ton ónhka'
down her body Not ever anyone
dropped

teskonwawennahrón:ken.
again one her voice
heard

Shatatáhsthohte' ne rokstén:ha tánon'
back he his the he is old and
body small made

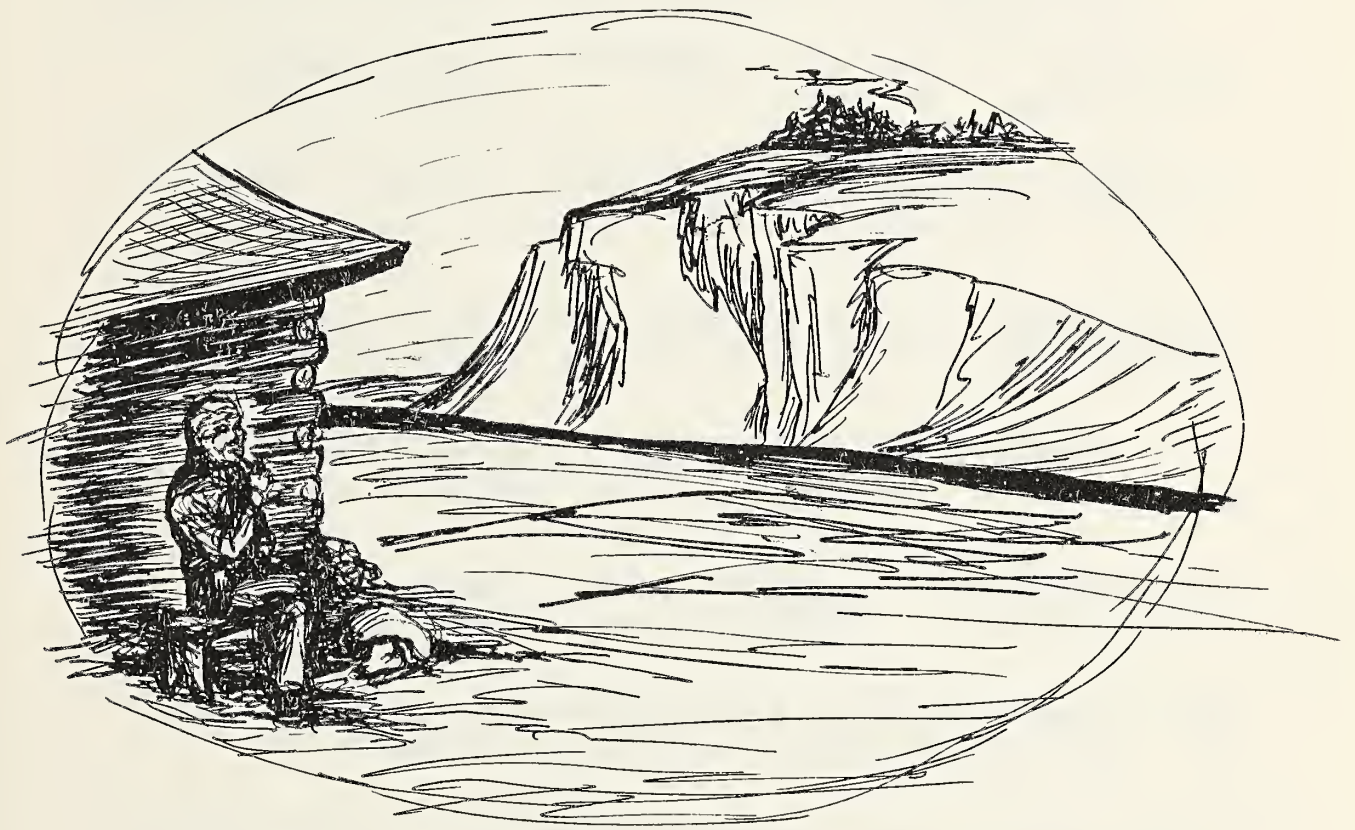
kanónhskon nionsá:re'.
house in there back
he went

The little man said, "Come with me." They stood at the edge of the canyon. He stretched himself right over the canyon and the lady started walking across his back, slipping and sliding, because instead of making himself hard and rigid, he made himself soft and flexible. The lady lost her balance and fell right to the bottom of the canyon. She was never heard of again.

The man and his dog lived very happily on the other side of the canyon.

A:nen Kaia'titáhkhe'

Annette Jacobs



IAH TEHOTEWEN:NARA

The Disobedient Youth

Iekaratónhkhwa' tsi kř:ken kén' nithoión:ha
it is told that this small he is aged

onkwehón:we raon'eskwaníhahkwe' iotahsontatíhen
real person he used to like middle of night

shé:ken ahoiakenhatié:seke' tsi nf:kon
still he would be out that time

ienhaiá:ken'ne' eniaí:ron' ne ro'nisténha,
he goes out she will say the his mother

"Tóhsa' sasa'nikónhrhen ohén:ton' ahsónthen
do not set out your mind before midnight

tontasahtén:ti' ase'kén nó:nen enwatóhetste'
to return home because when it will pass

ne' thó nitsohwistá:'e nek ne iáh
at this as is strikes metal just not

tekon'tkonhserí:io teskón:ne's."
is spirit good they are around

It is said that there was this Indian youth who
liked to go out till after midnight. Every time he
left the house his mother would say,

"Don't forget to be home before midnight, because
after this hour there is nothing but evil spirits outdoors."

Tia'tewahsón:take ne kén' nithoión:ha
night after night the small he is aged

enharhá:ratste' tsi iohsnó:re' ɛnshrawe'. Nek
he will promise that it is fast he will but
come back

ki' tsi tiótikon sho'nikónhrhens iahatkáhtho'
just because always he puts his he would look
mind back there

to nitsohwistá:'e nó:nen ne rontenro'shón:'a
how many it strikes when the they are friends
metal

tánon' raotihwá:tsire' enthontáhsawen' kakari:io's
and their family they will start good stories

tahontatkaratón:hahse'. Iotká:te iotkarátteron's.
they tell one another often scarey stories

Kí:ken wahsontá:te iahatkáhtho' karahkwaka'-
this night he looked clock

ión:tha'. Tontahani'tsónhkwahkwe' ionsahaiakénhstahkwe'
he jumped up he ran back out

ase'kén ó:nen tekeni tetsohwistá:'e. Iohsontahskats
because now two it strikes beautiful
metal night

Night after night the youth would promise to get home early, but he always lost track of time when his friends and family started to tell one another good stories, often scarey ones.

One night he looked at the clock and saw that it was two o'clock, so he jumped up and left the house. It was a beautiful moonlit night, so he was not frightened.

ahson'thénhka' ioráhkote' iáh othé:non tehohte-
 moon is out moon not anything is he

ron'ní:sere'. Onhka'k wahshakø:ken' taiakawenon-
 frightened of someone he saw her she is coming

hátie' tsi niahawenonhátie'. Tsi ø:nen ákta'
 toward where he was going when now near

wá:'onwe' tsakothonwí:sen' wa'í:ron,
 she she is feminine she said
 arrived

"Kwé, iohsontáhs-kats wáhi'. Ka' wáhse'?"
 hello beautiful night isn't where are you going
 it

"Sonkwahtentionhátie'," tahén:ron'.
 I am going back home he replied

"Niiohsontáhs-kats ánio ostón:ha tiahtén:ti,"
 such a beautiful let's a little we could
 night walk

wa'kén:ron'. Tahén:ron',
 she said he replied

"A:ke iáh tháon:ton' ase'kén sók ná:'a
 oh not is it possible as already

He saw someone come toward him and, as they got close,
 he saw that it was a girl. She said,

"Hello, isn't it a beautiful night? Where are
 you going?"

"I'm on my way home," he said,

"It's such a beautiful night, let's take a walk,"
 she said.

"Oh no, I can't. I'm already late going home,"
 he replied.

ohná:ken' í:ke' tsi sonkwahtentionhátié'."
 late I am that I am returning home
 going

Takén:ron', ne tsothonwĩ:sen',
 she replied the she is feminine

"Enskon'terónhna'." Skáthne i:ne' tsi
 I will walk you home together they to
 went

ó:nen iahá:newe' ate'én:rakon wa'kén:ron',
 now they got in the yard she said
 to

"Anio tsi iakennekeraientákhwa' ietiátien'
 let's in hay loft we sit

tánon' enteniká:raton'. Iáhse' thaiesaná:khwahse'
 and we will tell not so she could get angry
 stories at you

ase'kén ó:nense' tsí:sa."
 because already you are back

Iahiatáweia'te'. Kanekó:tote' ontkáthto',
 they two entered ladder she saw

wa'kén:ron',
 she said

The girl said,
 "I'll walk you home." They walked together and
 when they got to his yard, she said,
 "Let's go and sit in the hayloft and talk. Your
 mother can't get angry at you, after all you are already
 home."

The two of them entered and she saw a ladder. She

"Anio ieteniráthen a' káts í:se' íshent,"
let's we two go up o come on you go first

nek ki' tsi ne ranekénhteron' wahén:ron',
but the young man he said

"Í:se' íshent," sók kí tontáhsawen'
you you go so then she started
first

akaráthen'. Sha'tekane kotí:hen sháhe' ó:nen
for her to half way up the she was now
climb up ladder going

teka'nhia:ronhwe' iahaié:na' wahathon'kwáweron'
rod across it he touched he looked up

ó:nen wahatkáht'ho' tsi iáht tha'tewahsí:tonte'
now he looked that not did she have feet

teiotshinarén:tonte'. Tsi niió:re' tsi
she had hoofs so it is far that

wahoteronhiénhten' takaiakén:seron' ne raoká:ra'
he got frightened they came out the his eyes

said,

"Let's go up there. Ah come on, you go up first."
But the young man said,

"No, you go first." So she started to climb the
ladder. When she was half way up, he started to climb.
As he touched the rung, he looked up and saw that the
girl did not have feet but heavy hoofs. He was so
frightened that his eyes bulged out of their sockets.

tánon' tehohenrehtá;ne' raotinónhskon nionsa-
and he screaming in their home he went

hatákhe' iowennatshá:ni wá:ton,
running harsh voice it says

"Wesatera'swí:iohste' tsi iahten í;se'
your luck is good that not you

tesahén:ton ase'kén tóka' aesahén:ton' iaonsakon-
have you because if you would I would
gone first have gone first

ia'ténha' tsi nén;we'."
have taken till ever
you away

Shé:kon na'tehohenrēhtha' wahonwaié:na' ne
still he screaming so she held him the

ro'nisténha tánon' wa'í:ron',
his mother and she said

"E:so' ó:nen konhró:ri tsi iah
much now I have that not
told you

He went running into their home, with a harsh voice saying,

"You are very fortunate that you didn't go up first, for had you, I would have taken you away with me."

Still screaming, he was held by his mother, who said,

"I have told you many times that evil spirits



tekontkonhserí:io tiótkon ionatahsetonhátie's
is the spirit good always they are lurking

nahsonthenhnéhs hon'."
in the night

are always lurking in the night."

Rake'níha rakkaratón:ni
my father he has told me

Niioronhiá:'a
Mae Montour

TEHOSTERIHENHSERE'
He Is in a Hurry

| | | | | |
|---------|---------|--------|---------|-----------|
| Kiốtkon | iá:ken' | kí:ken | rón:kwe | énhtsken' |
| always | they | this | man | you will |
| | say | | | see him |

| | | | |
|------------------|---------|--------------|---------|
| ro'thahitáhkhe'. | Sawátis | ronwá:iats. | Kiốtkon |
| he is walking | John | he is called | always |
| along the road | | | |

| | | | | | |
|-------|-------------|------|---------------|-----|--------|
| ố:ni' | io'shátste' | tsi | rostorónkie'. | Tsi | nón:we |
| also | it was | that | he was | any | place |
| | fast | | rushing | | |

| | | | | | |
|----------|--------|---------|-------|---------------|-----|
| iến:re' | ố:nenk | iá:ken' | tsi | enhathahíta'. | Iáh |
| he walks | no | they | there | he will walk | not |
| | matter | say | | | |

| | | | |
|-------|---------|---------------------------|-----|
| shé's | iá:ken' | tha'tahatate'nikonhá:ren' | ne |
| then | they | would he trouble his mind | the |
| | say | | |

| | | | | | |
|------------|-----|-----|----------|---------------------|-----------------|
| ahréhsake' | ken | ne | hónhka'k | ken | ahonwaia'títa'. |
| for him to | for | the | someone | there he would give | |
| look | | | | him a ride | |

| | | |
|--------------------|---------|----------|
| Tha'kakié:ro'k ki' | iá:ken' | hónhka'k |
| suddenly | just | they |
| | | say |
| | | someone |

You can always see a fellow walking along the road. John is his name. He always seems to be rushing, but wherever he goes, he goes on foot. He would never put himself to the trouble of finding a ride.

One time, they say, someone came driving along.

tahohonwí:sere'. Wa'thá:ta'ne' wá:rehre'
 he came by car he stopped he thought

enhoia'títa'. Wa'thanhohón:ti' iá:ken' ne
 he will give he opened the they this
 him a ride door say

Sawátis. Iáh ki' tehawé:ren ratíta.
 John not just he thinks he gets in

Wahén:ron' iá:ken' kǐ:ken tsi níká:ien'
 he said they this the so it
 say lies

roia'tita'áhne', "Ka' wáhse'?"
 he was going to where are you
 give him a ride going

Wahén:ron' iá:ken' ne Sawátis,
 he said they this John
 say

"Tekahson'kahró:rens."
 to Hogansburg (split planks)

"Enkonía'títa' katí' ken?"
 shall I give then ?
 you a lift

The driver stopped, thinking he would give this hurried man a lift. John opened the door, but never thought of getting in.

The driver asked, "Where are you going?"
 John replied, "To Hogansburg."
 "Would you like a ride then?"

| | | | | |
|------------|---------|------|----------|-------------|
| Sahén:ron' | iá:ken' | ne | Sawátis, | "Iáhten, |
| he said | they | this | John | not at all, |
| back | say | | | |

| | | |
|-----------------------|----------------|-------|
| tewaksterihénhsere'." | Ok ná' iá:ken' | ó:ni' |
| I'm in a hurry | then it | also |
| | seems | |

sahanhóhaienhte'.
 he closed the
 door again

"Oh, no," replied John. I'm in a hurry."
 Then, it seems, he just closed the door and rushed off.

Oróte' Karihwénhawe'

Sister Dorothy Ann Lazore



IAH TESHATA:TI '
Silence

0:nen kwáh kén' náhe' kiotaḥsawen ki
 now just a ago it started this
 bit

| | | | | |
|-------------|---------------|---------|---------|--------|
| onkwehón:we | ronhténkie's. | Okia'ke | ǵkte'k | nón:we |
| original | they would | some | several | places |
| people | leave | | | |

| | | | |
|---------------------|-------------------|-------|--------|
| iehshotiio'tákie's. | Ronekiohkowa:nen | σ:ni' | akte'k |
| they were working | they were a large | also | other |
| | group | | |

[illegible]

| | | | | |
|---------|---------|--------|-------------|--------------|
| Okia'ke | iǎ:ken' | kĩ:ken | onkwehǒn:we | enshǒn:newe' |
| several | it is | this | original | they would |
| | said | | people | come back |

| | | | | | |
|-----|---------------|------|------|---------|-----|
| ne | onkwehonwé:ke | kwáh | se's | iá:ken' | iáh |
| the | Indian | just | then | it is | not |
| | | | | said | |

| | | | |
|----------|-----------------|-----|-------------------|
| thé:nen' | tehshonhrónkha' | ne | onkwehonwehnéha'. |
| anything | would they know | the | the way of the |
| | how to say | | original people |

| | | | | |
|------|---------|-------|---------|-----------|
| Kwáh | íá:ken' | ó:ni' | ókia'ke | tohkára'k |
| just | it is | also | several | a few |
| | said | | | |

Not too long ago people began to leave the reserve to work or to go to school. When they would come back, they would have forgotten how to speak Mohawk. After

niiohserá:ke, tó:wa' ɔ:ni' tohkára'k
years maybe also several

| | | | | |
|---------------|----------------|-----|-------|-----|
| niwenhní:take | ronahténkion' | nek | shé's | ne |
| months | they have gone | but | then | the |

| | | | |
|--------------|-----|--------|-----------------|
| shatikwáthos | tsi | nón:we | nihatĩ:teron'. |
| they would | at | the | where they live |
| return | | place | |

| | | | |
|-----------------|---------|-----|-------------------|
| Tenhshontátken' | íá:ken' | ne | ronatenro'shón:'a |
| they would meet | it is | the | they are friends |
| | said | | |

| | | | | | |
|-----|---------------|------|-------|---------|-----|
| ne | onkwehonwé:ke | kwáh | she's | ia:ken' | iah |
| the | original | just | then | it is | not |
| | people | | | said | |

| | | | |
|---------------------|-----|-------------------|------|
| tha'taontahontá:ti' | ne | onkwehonwehnéha'. | Kwah |
| did they speak a | the | way of the | just |
| word | | original people | |

| | | | | |
|-------|---------|-------|---------|----------------|
| she's | iá:ken' | ó:ni' | ókia'ke | thihonnéhtha'. |
| then | it is | also | several | they would do |
| | said | | | it on purpose |

| | | | |
|----------|---------|--------|-----------------|
| Shaiá:ta | íá:ken' | kí:ken | onkwehón:we |
| one man | it is | this | original person |
| | said | | |

| | | |
|--------------------|-----|---------------------------|
| iahonwaia'ténhawe' | tsi | iakenheion'taientákhkwa'. |
| they took him | to | the hospital |

several years or even several months they would return home for a visit. When they met up with their Mohawk friends, they would not be able to speak a word of Mohawk. They say some did it on purpose.

It seems that they had to take one fellow to the

IEHATIIEN:TERE'SKWE'
Prophecy

Ne khok ki' niwakká:raien' rake'níha
the and just so he has told my father
me

tsi oh nahó:ten' rakaratónhkhwahkwe' ken'
that what thing he used to relate then

shiiakwaksá:'a né:ne rotikstohokon'kénha' né:ne
when we were which they were old which
small

iehatiién:tere'skwe' tsi niiawénhshere' rontónhahkwe'
they used to predict as so it was they used
happening to say

tá:we' nenhnísera' ensewatkáhtho' kí:ken
it is the days you will see this
coming

kaniataratátie' enkontohétstake' katsi'noniowá:nen's
along the river they will pass large insects

né:ne iáh nonwén:ton tesewatkáhthon ok ó:ni'
which not ever have you seen only also

ne karonhia'kéhshon' enkontítie' sekén ne
the along the sky they will also these
fly

My father used to tell us, when we were small,
what the old people had predicted. They used to say
that the day was coming when strange insects would
pass by along the river, and that they would fly
through the skies, killing many people.

katsi'noniowá:nen's é:so' nón:kwe eniakório'.
 large insects many people they will
 kill them

On:wa' ki' wenhniserá:te' kerihwaién:tere's
 today just this day stories I know

oh nahó:ten' ratí:ton'. Ne kí:ken kén'
 what thing they mean the this this

nón:we nikaná:taien' tenwatté:ni' iáh kahnawá:ke
 place so the town it will not Caughnawaga
 (rapids place)

thenskénhake'. Iáh ó:ni' onkwehonwehnéha'
 will it live not also original people
 again

thenhshako'nikonhrotákwen iáh ó:ni' ónhka'
 will it confuse one's mind not also anyone

thaonsaiontatíhseke' nonkwawén:na' enionkwatewennáhton'se'
 will they speak our language will we lose our word

ok ó:ni' nonkwaianerénhshera' tenwatté:ni'.
 and also our law will it change

O:nen ki' tiotáhsawen tsi teiottenionhátie'.
 now even it has begun that it is changing

Now, today, I understand what they meant by these stories. This very place will change. It will no longer be the Caughnawaga we know. We Indians will no longer speak our language, and, along with our words, we will lose our law. Already we can see this. The white man's

Ne sewatkwénie's ne ratihnara'kenhnéha'.
the it takes over the white man's way.

I:'i wakhiá:ton.
I I wrote this

A:nen Karonhiahén:te' Sky
Ann Before the Skies

Rówi Shohé:rese' rake 'nihkénha' ne
Louie my late father he

rakkaratónhkhwahkwe'.
he used to tell me

way is taking over.

This was told by Ann Sky, who heard it from her
father, Louie Shohé:rese'.

(Orote' Karihwenhawe')
Sister Dorothy Ann Lazore

KAHNAWA:KE AOKA:RA'
The Story of Caughnawaga

Tóka' iá:ia'k - iawén:re' tewen'niáwe'
about six teen hundred

tánon' iá:ia'k -niwáhsen tsá:ta shiiohserá:te'
and six ty seven such was the
year

tohkára' nikahwatsí:rake onkwehón:we
a few families original people

wahonhtená:taien' ákta' kenhtá:ke tsi
they towned near La Prairie to

kaniataratátie'. Tóka' iá:ia'k - iawén:re'
along the river about six teen

tewen'niáwe' tánon' tsá:ta - niwáhsen shi-
hundred and seven ty such

iohserá:te' wa'thoná:tahkwe' kén:'en, kahnawá:ke
was the year they moved here Caughnawaga

wahóntien'.
they sat

Tóka' iá:ia'k máir tsi nikaná:tes tánon'
about six miles as so the settle- and
ment is long

About 1667 some Mohawk families settled near La Prairie by the rapids of the St. Lawrence River. In 1670 they moved to their present location but kept the name kahnawa:ke, which means "by the rapids."

akwé:kon ne kahwá:tsire' rotinónhsote', Otia'ke
all the family their house some
stands

| | | | | | |
|-----|--------------|-------|-----------|-----|-------|
| ne | raotinónhsa' | ó:nen | tiotí:ion | ne | tsi |
| the | their house | now | on the | the | there |
| | | | sides | | |

| | | | | | |
|------------|---------|-------|-----|-----|---------------|
| otstén:ra' | wátston | tho | ni | tsi | ronón:nihske' |
| stone | it was | there | the | as | they used to |
| | used | | | | build |

| | | | | |
|-----------------|---------|-------|-------|--------------|
| norihwaká:ion'. | Otia'ke | ó:nen | énska | tewen'niáwe' |
| the thing is | some | now | one | hundred |
| old | | | | |

| | | | | | |
|--------|--------|----------|---------------|-----|---------|
| tánon' | wisk - | niwáhsen | niiohserá:ke | tsi | náhe' |
| and | five | tens | so many years | so | it goes |

| | | | | |
|-----------|--------------|-----|--------------|-----|
| tkáhson', | Teionáktane' | ne | raotinónhsa' | ne |
| there it | two places | the | their house | the |
| is | | | | |

ronón:ni' ô:nen tsi ki' ní:iot ne ronátia'ke
they have now as just as it is the other
built

| | | | | | |
|-----|----------------|-----|---------|-------|-----|
| tsi | rotinonhsó:ton | ne | koráhne | neká. | Tsi |
| as | their kind of | the | govern- | side | at |
| | house | | ment | | |

iakenheion'taientâhkhwa' ne kwâh tkanonhsowâ:nen.
they use it to lay the dead the most large building

are single family dwellings. The very old homes are made of stone, and the owners proudly informed me that they are about one hundred fifty years old. The other houses are similar to the newer ones built throughout Canada. The largest building is the three story Kateri Memorial Hospital.

| | | | |
|-----|-------------------|-----|--------------------------|
| Tsi | tenhsatstekáhwha' | tsi | kanatakwe'niió:ke |
| as | you will travel | at | the main part of
town |

ne kí:ken enhsatkáthto' : tsi iontenhninón:tha',
the this will you see where one sells things

| | | |
|-------|-------------------------|--|
| tsi | ionterihstahninón:tha', | iah tha'tekaiahsonthá:ke |
| where | one sells iron | not does one make the sign
of the cross |

ionterennaientákhkwa', tsi ratitsenhaientákhkwa',
one uses it to pray where they use it to lay sparks

| | | | | |
|-------|------------------------------|-------|---------------|-------|
| tsi | ratirih ^h tón:ke, | tsi | ron'swáhtha', | tsi |
| where | the place | where | they | where |
| | of the police | | extinguish | |

teiontska'hónhkhwa', tsi ionteiennahninón:tha',
one uses it to eat where one sells oil

| | |
|-----------------|---------------------------|
| karonhianónnha' | ionterihwaienstákhkwa'. |
| she watches the | one uses it to lay words. |
| sky | |

Tsi tiotierénhton enhsatkáhtho'
at first will you see

| | | |
|---------------------|-------|--------|
| kana'tsheraktátie', | tsi | iaken- |
| along the canal | where | the |

heion'taientâhkhwa', tsi shakotitsên:tha',
 hospital where they heal them

As you travel along the main highway, you will see signs such as these: store, hardware, United Church, Iroquois Council Office, Police Department, Fire Department, restaurant, garage, and the Karonhianonha' School.

Along the old main highway, these signs greet you:

| | | | | |
|---------------|-----|----------|-----|------------|
| tiotierénhton | tsi | niió:re' | ne | ahsénhaton |
| first | so | so it is | the | third |
| | | far | | |

| | | | | |
|--------|-----------------|-------------|-----|----------|
| tánon' | karonhianónnha' | kaieríhaton | tsi | niió:re' |
| and | she watches the | fourth | so | as it is |
| | sky | | | far |

| | | |
|--------------|------------------|----------|
| iahiá:khaton | ronteweiénstha'. | Akwé:kon |
| sixth | they are | all |
| | learning | |

| | | | |
|-----------------|------------|--------|-------------------|
| ronteweiénstha' | ahontá:ti' | tánon' | ahonterennó:ten', |
| they are learn- | for them | and | for them to |
| ing | to speak | | sing |

| | | | |
|---------------|-----------------|--------|-------------------|
| tiorhén:sha', | o'seronni'kéha' | tanon' | onkwehonwehnéha'. |
| British | the way of the | and | the way of the |
| | axe makers | | original people |

| | | | |
|---------|--------------|---------|----------------------|
| Kaié:ri | tewen'niáwe' | nihá:ti | iehonterihwaiénstha' |
| four | hundred | of them | they cause words |
| | | | to lay there |

| | | | | |
|-------------|--------|--------------|-----|--------------|
| sharhé:'on. | Tsá:ta | nikahiá:ton' | tsi | niió:re' |
| Chateauguay | seven | -th | so | as it is far |

| | | |
|-----------------|-----------------------|---------|
| enska-iawén:re' | thonwatirihonnién:ni. | Otia'ke |
| one teen . | they make words for | some |
| | them there | |

| | | | |
|-------------------|-----------------|------------|-------|
| onkwehonwehnéha' | ronteweiénstha' | akté:shon' | ó:ni' |
| in the way of the | they learn | all over | also |
| original people | | | |

Karonhianonnha' with grades four through six, are busy learning to speak and to sing in English, French, and Mohawk. Four hundred pupils attend H. Billings High School in Chateauguay. They study there from grades seven to eleven. Other young people study in various

nón:we nithotiión:sa iehonterihwaiénstha'.
place they are young they cause words to lay there

Otia'ke ó:ni' "Manitou College" iehón:ne's.
others also they go there

Tiótkon nia'té:kon ronaterihwahtentiá:ton
always many things they are starting matters

ne ratinákere' ne ratiksa'okón:'a raoterihwá:ke.
the they live the children on their behalf

Tóhka' niiohserá:ke tsi náhe' rotinonhsíson
several years ago they finished
a building

ne ratiksa'okón:'a raotitióhkwa' raoná:wen.
the children their group it is theirs.

Tóhka' na'teionáktane' ionáktote' tsi nón:we
several there are two place stands at now
places

ne ahátihsón'karaké:tate' tánón' tahatitsi'nehtará:ron.
the for them to scratch and they are stringing
the planks beads

Ratiwennahnotákhkwa' ió:ien' tánón' ó:ni'
they use it for it lays and also
reading

ió:ien' tsi nón:we niiontia'tahkaríohstákhkwa'
it lays at the which they use to make their
place bodies suppl

schools in Montreal. Still others go north to Manitou College.

The residents of Caughnawaga are always involved in projects for the children. Several years ago they completed the Girls' and Boys' Clubs, where the children

| | | | | | |
|----------------|-----|-------|--------|-------------|-------|
| kanonhsowá:nen | ne | eh | nón:we | nia'tɛ:kɔn | σ:ni' |
| large building | the | there | the | many things | also |
| | | | place | | |

né:'e nón:wa' ioterihwahtentiá:ton'. E' thó
it is now they have started that is
 matters where

E' tho
that is
where

| | | | |
|------------------|-------|--------------|-------------|
| tehonhthénno'ks. | Akte' | nithonéhtha' | nahonte'ni- |
| they play ball | all | they come | for them to |
| | over | | |

konhró:ri'.
have fun

| | | | |
|---------|---------------|----------------|-----|
| Tóhka' | niiotióhkwake | rotinén:raien' | ne |
| several | clubs | they have a | the |
| | | group | |

ia kotehiá:ron' : Legion, Knights of Columbus, Moose,
they are adults

| | | | |
|--------|--------------|--------------------|-------|
| tánon' | Marine Club. | Ionkhihsothokón:'a | ó:ni' |
| and | | grandparents | also |

| | | |
|------------------|------------------|--------------|
| rotinén:raien'. | New Horizon Club | konwá:iats. |
| they have a club | | it is called |

New Horizon Club

konwá:iats.
it is called

| | | | |
|------------------|-----|--------------|-------|
| Ronatiohkowá:nen | ne | kahwá:tsire' | né:ne |
| a large group | the | family | who |

can go to do crafts and beadwork. There is a library there and also a gymnasium. Children come from all over to play ball there.

Parents are busy at the Legion, Knights of Columbus, Moose Club, Marine Club, and other organizations. Grandparents enjoy themselves at the New Horizon Club.

Summer is a happy time. Many families return

| | | | |
|----------|------------------|------------------|-----|
| kanón:no | iehati'terón:ton | tethatinatá:re's | ne |
| New York | they live there | they return to | the |
| City | | visit | |

| | | | | | |
|------------|-----|--------------|-------|---------|-----|
| kahnawá:ke | ne | akenhnhá:ke. | E:so' | rón:ti | ne |
| place at | the | in summer | many | of them | the |
| the rapids | | | | | |

| | | | | |
|-------------|-----|--------|-------|---------------|
| ratiíenthos | ne | áhsen, | né:ne | ienakarótha', |
| they plant | the | three | which | pole beans |
| | | | are | |

| | | |
|----------------|--------|------------------------------|
| onenhste'ón:we | tánon' | onon'onsera'shón:'a, |
| original maize | and | various squashes |
| | | (including pumpkins, melons, |
| | | cucumbers, etc.) |

| | | |
|---------------|--------------|-----------------|
| Rono'éskwani' | ahontawénha' | kana'tshera:kon |
| they like it | for them to | in the canal |
| | go bathe | |

| | | | |
|--------|-----------------|-----|-------------------------|
| tánon' | ratiksa'okón:'a | tsi | iontawenstákhkwa' |
| and | children | at | one uses it to
bathe |

| | | | |
|---------------|-----|-------------------------|-------|
| rontawénhe's. | Tsi | iakenheion'taientákhwa' | ísi' |
| they go to | at | the hospital | over |
| bathe | | | there |

| | | | | |
|------------|-------|--------|--------------------|--------|
| na'oháhati | tho | nón:we | nihontawenstákhwa' | tánon' |
| across the | there | the | where they use to | and |
| road | | place | bathe | |

from New York City to visit their Caughnawaga relatives. Most residents can be seen working in their gardens, where they plant the three sisters: corn, beans, and squash. People like to swim at the town beaches, and the children especially enjoy the public pool near the

tehonthénno'ks. Roti'nikonhró:ris ne
they play ball they enjoy it the

rotinonhwaktanión:ni. Ken'k ó:ni' niió:re'
they are sick there also so it is far

ne ronten'nikonhró:ris ne ratiksa'okón:'a
the they enjoy it the children

ronteweiénstha' ne ahatiká:we' ĩ:non akté:shon'
they learn they would far all over
paddle

nón:we enthón:ne' ne kwáh tenhontátien'te'
the they will the just they will arrive
place come

tsi tenhonré:ron'.
so they will race

Otia'ke ronon'éskwani' tewa'á:raton tánon'
some they like lacrosse and

golf tahonhthénno'ke'.
they play

Né:ne kwáh aonhá:'a roti'nikonhroriá:tha'
that most they they enjoy
which

nó:nen enhatinenhríneken'ne' tánon' tenhonatatá:se'
when they will bring the and they will go
whole crowd out around town

hospital. The patients enjoy watching the children
swim and play ball there. The children can also be
seen practicing in kayaks and canoes for their races
Others enjoy lacrosse and golf.
The big event is the Fire Brigade Parade. We are

| | | | |
|-----|---------------|-------------------|-----|
| ne | ron'swáhtha'. | Teiakhirénhsarons | ne |
| the | they | we are proud of | the |
| | extinguish | them | |

| | | | |
|---------------------|-----|---------------|-----|
| onkonkwe'tahshón:'a | ne | ron'swáhtha'. | Tsi |
| men | the | they | so |
| | | extinguish | |

| | | |
|---------|----------|------------------|
| nihá:ti | akwé:kon | rontatsnié:nons. |
| of them | all | they help freely |

| | | | |
|-----------------|-----|----------|--------------|
| Ionkwe'éskwani' | tsi | niiátion | kahnawá:ke |
| we like it | so | many of | the place at |
| | | us | the rapids |

iakwanákere'.
we inhabit

very proud of the skills of our volunteer firemen.

Life is nice at Caughnawaga.

Kawennanó:ron'

Dorris Montour



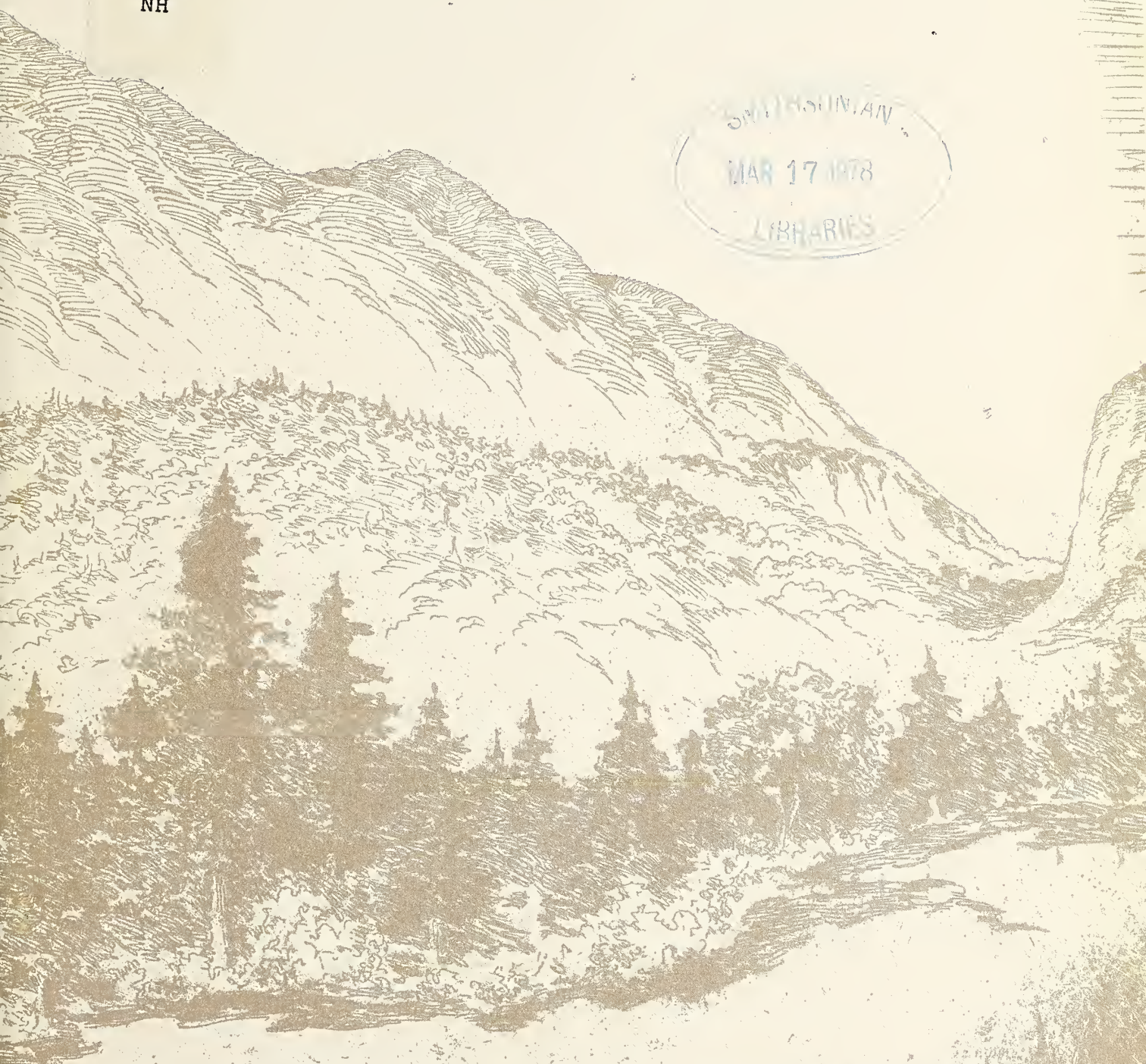
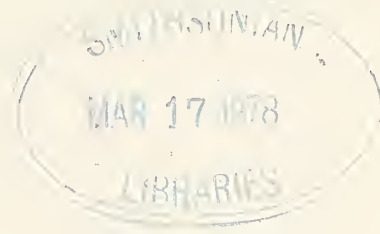
THO NI : KON



Species Diversity and Community Structure in Bryophytes: New York State Studies

Nancy G. Slack

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THE STATE EDUCATION DEPARTMENT
Albany, New York 1977

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Russell Sage College

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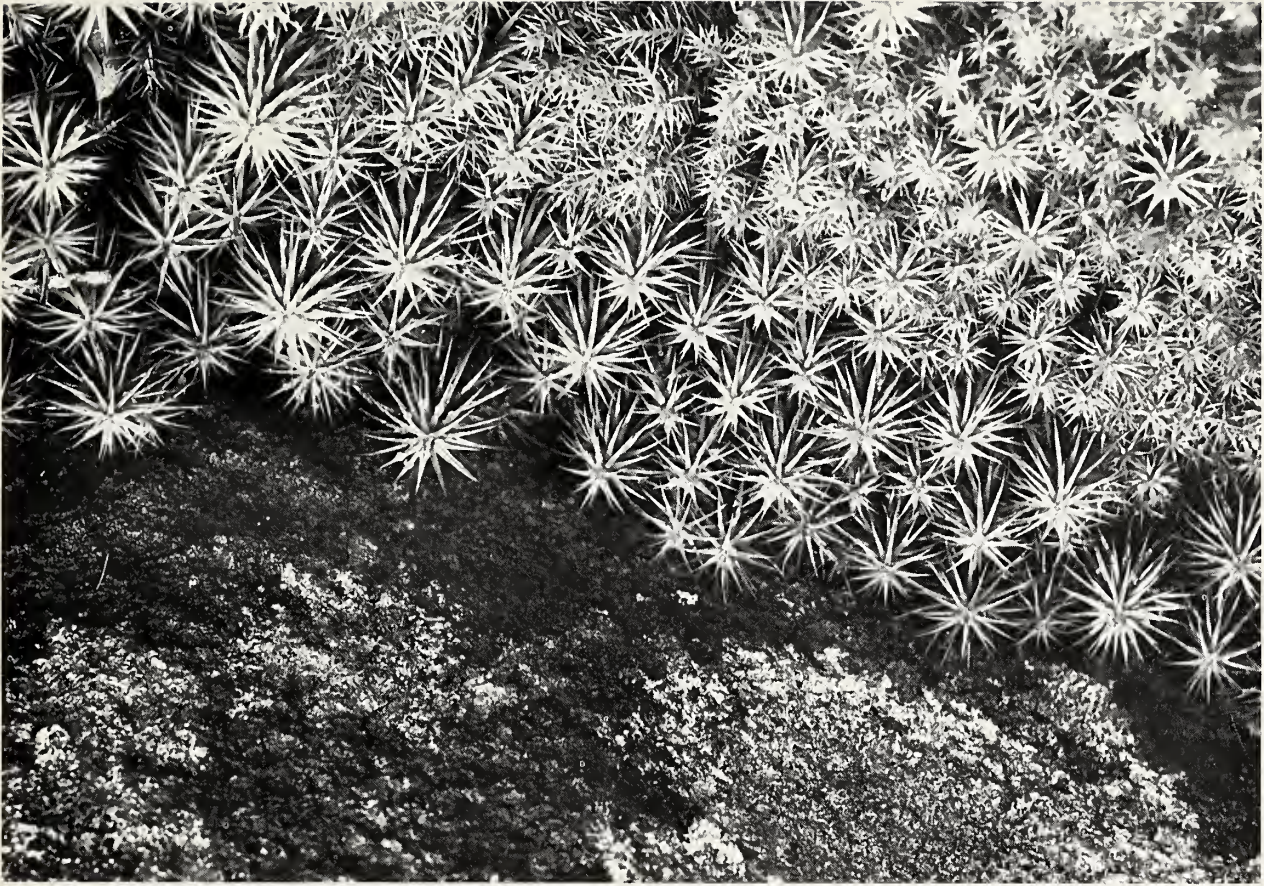
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Polytrichum juniperinum and *P. piliferum* near timberline, Whiteface Mountain.

(photo by A. B. Wellborn)

Both Forbes and Darwin realize struggle but see that it has produced harmony. Today perhaps we can see just a little more. The harmony clearly involves great diversity, and we now know . . . that every level is surprisingly diverse. We cannot say whether this is a significant property of the universe; without the model of a less diverse universe, a legitimate but fortunately unrealized alternative, we cannot understand the problem. We can, however, feel the possibility of something important here, appreciate the diversity, and learn to treat it properly.

G. Evelyn Hutchinson, 1965
in *The Ecological Theatre and the
Evolutionary Play*

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COVER: Mt. Whiteface in the Adirondack Mountains. Etching by Herbert S. Kates.

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Species Diversity and Community Structure in Bryophytes: New York State Studies

by Nancy G. Slack

Introduction

The Early Study of Bryophytes in New York State

The study of the mosses and liverworts of New York State has a long history. Collections in the New York Botanical Garden go back 150 years. During the period between 1830 and 1910, more than 40 different men and women made permanent collections of bryophytes in New York State.

Charles Horton Peck, who was the first official New York State Botanist and is now known primarily as a mycologist, did important work on bryophytes early in his career. He collected specimens in both the Adirondacks and the Helderbergs, the two areas included in this study. In 1866, he published a list of New York State bryophytes in the Nineteenth Annual report of the Regents of The University of the State of New York. This early list included 274 mosses and 66 liverworts.

Three other important bryologists also contributed to this list: Leo Lesquereux, the Hon. George W. Clinton, and Coe Finch Austin. Austin collected specimens mostly in Orange County, New York, but also near Albany, and he determined specimens for other bryologists, including Peck. He was also the first American authority on liverworts. Clinton, son of Governor DeWitt Clinton, was a judge in Buffalo, and collected mainly in western New York and around Niagara Falls. Lesquereux, who came to this country from Switzerland in 1848, was primarily a paleobotanist, the authority on the Appalachian coal flora and, as such, the first member to be elected to the newly formed National Academy of Sciences. He was also a very active bryologist who worked with William S. Sullivant in Columbus, Ohio, but collected widely in areas including the Adirondack Mountains of New York. Before 1866, he had collected on the top of Mt. Marcy, the highest Adirondack peak, as well as on Whiteface Mountain, on which most of this study was done. He corresponded with and encouraged Peck, as can be seen from the following letter, written in 1867:

Cambridge, 23 October, 1867

My dear Mr. Peck,

Your letter of the 5th and package of mosses was

sent to me here in Columbus. I received it today only. I shall return home about the 7th of November and will then examine your specimens and report. I was glad to hear from you again and expect some fine things from you from the Adirondaek Mts. I found also some mosses especially *Orthotricha* around Placid Lake [Lake Placid] but still more at and near the top of White side [Whiteface?] Mt. and Mt. Marcy. Did you reach Mt. Marcy?

Your friend,

L. Lesquereux

These early bryologists worked almost entirely without manuals. In another letter to Peck, Lesquereux replied to a question of Peck's that no, there was not any manual to use for hepatics. Lesquereux and Thomas P. James first published a *Manual of the Mosses of North America* in 1884. There were, however, early collections of bryophytes both in Albany and New York City, and later at Cornell University in Ithaca, as well as in private collections. Many specimens were exchanged among bryologists; Austin, for example, received collections from bryologists in British Columbia, New Brunswick, South Carolina and Florida, as well as from New York State. Peck corresponded with a dozen other bryologists, and sent out many specimens.

The nineteenth-century bryologists came from a variety of professions, and many of them traveled widely. Thomas Potts was a druggist, Clinton, a judge. George Best, Elliot C. Howe, and Smith Ely Jelliffe were all physicians, as well as active bryophyte collectors in different parts of the State. William Brewer was a geologist and botanist and later professor of agriculture at Yale University. He made collections in California and Alaska as well as in New York. Orator Cook, an early collector of hepatics in New York State, was an agent for the State colonization Society in Liberia, and collected specimens there and also in the Canary Islands. George Nash, head gardener at the New York Botanical Garden, collected in Florida and Haiti as well as in



(photo by A. B. Wellborn)

Closeup of *Hylocomium splendens*.

New York. Anna Murray Vail, librarian at the Garden, collected in New York before moving to France.

Perhaps the most interesting of the earlier collectors was Robert Statham Williams (Steere, 1945). At the age of 20, he moved out to the Montana wilderness where he was a homesteader, miner, explorer, and Pony Express rider. During the gold rush, he moved to the Yukon and became the first resident bryophyte collector. After trips to Peru, Bolivia, the Philippines and Panama, all in the early 1900's, he gave up his travels and worked for most of his remaining years at the New York Botanical Garden.

In the Adirondack region of New York State, much bryological exploration has taken place since Lesquereux's early mountain trips. Among the collectors near the turn of the century were Elizabeth Knight Britton, Charles H. Peck, Annie Morrill Smith, and Caroline Haynes. Elizabeth Britton, who was brought up in Cuba and later made many West Indian bryophyte collections, was largely responsible for building up the early bryophyte collections at Columbia University and the New York Botanical Garden. She did much collecting in the Adirondack high peaks area, particularly in the 1890's while staying in several of the early lodges, such as the Ausable Club Lodge, St. Hubert's, and Adirondack Lodge near Lake Placid. She collected in the heart of the mountains from these locations, as I have discovered by examining her herbarium specimens at the New York Botanical Garden.

Charles Peck, then State Botanist, published in 1898 an account of the plants of the town of North Elba, Essex County. This town includes several of the Adirondack high peaks, including Mt. Algonquin (McIntyre). He also commented on collections made on Whiteface Mountain, although this mountain is north of the town boundary. Peck listed 149 mosses and 32 liverworts, most of which were collected by Britton or himself. Other collectors included George Atkinson, mycologist and Cornell professor. Peck gave habitats as well as localities for the more unusual species. The localities given show that some of the best collecting areas for bryophytes, such as Mt. Algonquin and Indian Pass, were already well explored at this early date.



(photo by A. B. Wellborn)

Hylocomium splendens, a moss collected early in bryological exploration of the Adirondacks, by Peck on Mt. Marcy.

Annie Morrill Smith and Caroline Haynes also collected bryophytes in the Adirondacks in the early 1900's. Annie Morrill Smith studied botany in Europe, was editor of *The Bryologist* from 1900 to 1910, and eventually gave 20,000 moss and lichen specimens to the Brooklyn Institute of Arts and Sciences. In 1906, she published in *The Bryologist* a list of mosses from the vicinity of Little Moose Lake, near Old Forge in the western Adirondacks. In the same issue Caroline Haynes published a list of hepatics from the same region.

Much bryological exploration was also done in the Lake George region and the southern Adirondacks. One of the earliest collectors (1864-68) was Dr. E. C. Howe of Yonkers. Dr. Smith Ely Jelliffe collected in 1888-89 around Huletts Landing, and Dr. George Hulst, a Brooklyn botanist, at Assembly Point in 1898-99. Stewart Burnham (1919, 1920, 1929) of Hudson Falls published lists of bryophytes of the Lake George region. The region was broadly defined and

specimens from Washington, Saratoga, and even Essex and Warren Counties were included. Many bryologists were involved in the compilation of these lists, in addition to the above. Among them were George Clinton, Charles Peck, Elizabeth Britton, and also Wallace Greenalch of Albany, who collected in many parts of the State at the turn of the century. Burnham's own collections were first made in 1892 and were determined by Professor John Holzinger. Later, A. L. Andrews and Carl Warnstorf were involved in determining *Sphagnum* species; A. W. Evans and Caroline Haynes were among those determining hepatic species. Daisy Levy (1919) also published a separate list of mosses from Lake George.

It is clear that a great many bryologists were active in New York State and particularly in the Adirondack region prior to 1920. More recent Adirondack collectors include F. J. Herman, Stanley J. Smith, E. H. Ketchledge, Daniel Norris, Norton Miller, Richard Andrus, and myself.

All the early work on bryophytes in the State was floristic. That work continues and species new for the State and for the Adirondacks are still being discovered. In the checklist of the mosses of New York State compiled by E. H. Ketchledge (1957), the State was divided up into floristic districts based on latitude and longitude. A few more mosses have been discovered in the State since then, and there are many new district records, including a few from my studies. No similar published checklist is yet available for hepatics. Habitat information was given by some of the above authors, notably Peck and Burnham, but there is a lack of published ecological studies of bryophytes in New York State. In this respect, the present work is a pioneering venture; much of it could not have been carried out, however, without the floristic work of so many of these bryologists.

The Study of Species Diversity

Although diversity has long been of interest to biologists and naturalists, the interpretation of diversity has been a great challenge to ecologists in the past 15 years. Species diversity is of prime importance in understanding community structure and the dynamics of natural communities. Diversity, both in terms of species richness or variety (the number of species present) and of the relative abundance of these species, has been related to other important aspects of community structure. These include productivity, succession, stability, competition and habitat complexity. In addition to its theoretical importance in understanding community structure, diversity is also of practical importance for interpreting vegetation changes following human disturbance.

Species diversity has been studied in a great variety

of organisms including diatoms, insects, fish, lizards, birds, mammals, and vascular plants. Vascular plant studies relevant here include those by Johnson, Mason, and Raven, 1968; Whittaker, 1965, 1969; Pielou, 1966, 1969; Monk, 1967; Monk, Child, and Nicholson, 1969; Johnson and Raven, 1970; Auclair and Goff, 1971; Risser and Rice, 1971; Reiners, 1972; Shafit and Yarranton, 1973; Nicholson and Monk, 1974; and Siccamo, 1974. Most of the vascular plant work deals largely with tree diversity, although several of the above also include shrubs and herbaceous vascular plants.

Few diversity studies have been carried out on non-vascular plants other than phytoplankton. Nash (1972) discussed lichen species diversity in relation to pollution; Hoffman (1971) discussed diversity of epiphytes on Douglas fir, and a study of plant diversity in Alaska by Reiners, et al., includes bryophytes. Nonvascular plants, and especially bryophytes, show high species richness in many different habitats, and constitute a relatively important component of the vegetation at a variety of latitudes, as, for example, in tropical and temperate rainforests, boreal bogs, and Arctic tundra. The relationships of bryophytes to other primary producers in a community have been explored to some extent in terms of biomass (Bliss, 1966) but not in terms of diversity or of theoretical aspects of community structure.

Phytosociological studies of bryophytes, or analyses of vegetation in which bryophytes are recognized as an important component, have been carried out especially in Europe (Dahl, 1957; Gimingham, 1966; Yarranton, 1967a) and in Canada (Stringer and LaRoi, 1970; Yarranton, 1970; Neal and Kershaw, 1973; Stringer and Stringer, 1973).

Bryophytes differ from most vascular plants in some aspects of their basic biology: nutrient procurement (lack of roots), dispersal (spores, swimming sperm, vegetative propagules) and genetic system (dominance of haploid plant). It seems likely that some of these differences cause bryophytes to play a different role in community structure from vascular plants of similar size. The present study was undertaken to elucidate diversity relationships among bryophytes, and the relation of bryophytes to the structure and evolution of communities in which they are found.

Some basic questions can be asked about diversity in the Adirondack and Helderberg plant communities analyzed in the present study. Trees, shrubs, and herbaceous vascular plants as well as bryophytes were included. For example, by sampling a particular segment of a community, e.g., vascular plants, is one "obtaining an index to the overall diversity of the system" (Johnson and Raven, 1970)? Are diversity patterns for shrubs, for example, similar to those for bryophytes as

one ascends Whiteface Mountain? Is species number a sufficient indicator of diversity, or is an evenness component, based on the relative abundance of the species present, also important? This evenness component of diversity has also been related to the question of whether certain groups of organisms consist largely of opportunistic or equilibrium species (Tramer, 1969). The present study provides data on this question for bryophytes, some of which are considered opportunistic on other grounds (Schofield, 1971; Schuster, 1966).

Other questions concern taxonomic diversity. Should all species be considered ecological equivalents in terms of diversity? Should a forest with three species of oaks as dominants or a bryophyte community with three species of *Polytrichum* be considered as diverse as one with three dominants, each belonging to a different genus?

If there are relatively few species in a community, as, for example, in the arctic-alpine communities above timberline, are the species more likely to belong to different genera than if there are many species? Such questions of taxonomic diversity have been explored for other organisms (Lloyd, Inger, and King, 1968; Simberloff, 1970) but not previously for bryophytes.

In many previous studies, attempts have been made to correlate diversity with environmental factors, both biotic and abiotic. This has not been done for bryophytes except in specialized communities, such as bryophytes of bogs (Vitt and Slack, 1975) or epiphytic bryophytes (Hoffman, 1971). I have studied bryophyte diversity in relation to a number of such factors in the Helderbergs (Kenrose Preserve), part of the present research.

Several workers have attempted to determine the variables affecting species diversity in a particular region using multiple regression analyses. Such studies largely concern birds or vascular plants. I have made a similar analysis of mosses of New York State, using the checklist compiled by Ketchledge (1957), based on districts into which the State has been divided for floristic studies. Variables used in the analysis and results obtained are discussed below. One result, that the range of elevations within a district is an important determinant of diversity, was used in setting up my field studies. These studies included gradient analysis of bryophyte diversity in relation to other environmental factors. Biotic factors such as diversity of other primary producers in the community have also been considered. The methods used in these studies are described in the following sections.

The Study Areas

Adirondack Areas—Whiteface and Ampersand Mountains

Adirondack field studies were carried out in the two floristic districts with the greatest range of elevation in New York State, districts 3 and 4 (see map, fig. 1). These districts include the Adirondack high peak area, including the highest mountain in the State, Mt. Marcy, 5344 ft (1629 m). The summits of this mountain and of several other Adirondack peaks including Whiteface Mountain, 4867 ft (1484 m) are above timberline and support an arctic-alpine flora. One major part of this study was conducted on Whiteface over an elevation range of 1600 to 4800 ft (488–1463 m). Whiteface, the fifth highest peak, is located at 44°21', ten miles north of the major high peak area of the Adirondacks. As a solitary peak it is more exposed than the other mountains in that area, and the summit is particularly subject to rigorous climatic conditions.

The winter is long and the growing season correspondingly short, only 80–105 day in this part of the Adirondacks (Stout, 1956; Feuer and Hager, 1956; Hartwig and Peech, 1963). At the higher elevations of Whiteface, it may average only 50–70 days (Nicholson and Scott, 1969). I have seen several feet of snow in June in the balsam fir (*Abies balsamea*)¹ forest at 4400 ft (1341 m) on Whiteface.

The other Adirondack study area was Ampersand Mountain in district 3, south of Saranac Lake (see map, fig. 1). This mountain, just over 3300 ft (about 1000 m) shows little sign of disturbance by fire, logging, or other human activity. Epiphytic vegetation is well developed on this mountain, bryophytic epiphytes occurring on a variety of hardwood and conifer trees. These epiphytes were also included in the present study. The elevations studied on Whiteface and Ampersand Mountains overlap between 1600 and 2800 ft (488–854 m) so that both hardwood forest and spruce-fir forest vegetation could be compared on the two mountains.

Heimberger described the vegetation types for the Adirondacks (1934), but little work was published on the Adirondack forest for the next 30 years. Since 1963, a large scale study of the vegetation of the Whiteface area, particularly in relation to topographic gradients has been conducted (France and Lemon, 1963; Holway, Scott, and Nicholson, 1964; Scott and Nicholson, 1969; Scott and Holway, 1969; Nicholson and Scott, 1969; Breisch, et al., 1969). Soil (Witty,

¹ Names of vascular plants follow Fernald, M. L. 1950, Gray's Manual of Botany, American Book Co., New York, with the exception of *Quercus borealis* Michx.f. and *Betula alleghaniensis* Britt.

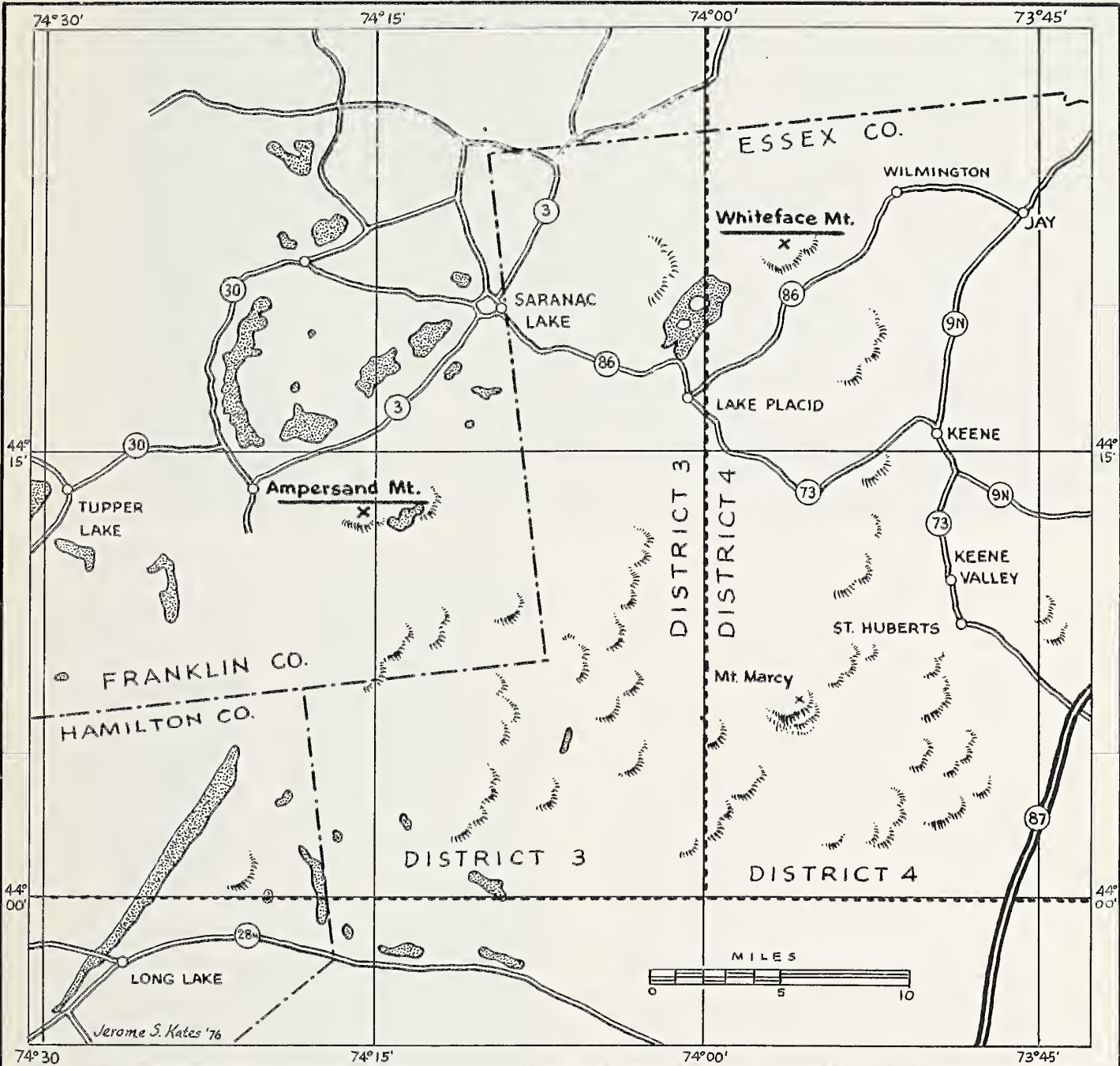


FIGURE 1 Whiteface Mt. and Ampersand Mt., sites of Adirondack field studies. By Jerome S. Kates.



(photo by N. G. Slack)

Deciduous forest of considerable *Betula papyrifera*, along Wilmington trail, Whiteface Mountain.

1968) and weather data (Falconer, 1963) have also been published. Very little of the published work bears directly on diversity of bryophytes. According to the above authors, nonvascular plants were not included in their studies because of the difficulty of identification.

The Wilmington trail area of Whiteface Mountain, in this study, has not been damaged by tourists; it is, in fact, much less used than the trails in the Marcy-Algonquin region of the Adirondack high peaks. Summit disturbance is confined to the relatively small area visited by tourists; no quadrats were established in that area. The great majority of the area above timberline is undisturbed except by natural rockslides. Some areas at lower elevations on Whiteface, particularly between 2000 and 2500 ft (about 600–750 m) are undergoing secondary succession, probably as a result of fire, as indicated by the presence of *Betula papyrifera*, *Populus grandidentata*, and other successional trees. Disturbance is not recent; there have been no major fires here for at least 50 and probably 70 years (Holway, Scott, and Nicholson, 1969). There has been no lumbering since 1896 when protective forest legislation was established. By using one of these areas, bryophyte diversity and species composition could be compared for “disturbed” and “undisturbed” areas (or earlier and later stages of succession of canopy trees) at the same elevation. I have made this comparison both on Whiteface and between Whiteface and Ampersand Mountains.



(photo by N. G. Slack)

Base of Whiteface Mountain trail, near Wilmington, N.Y.; hemlock-hardwood forest.

Helderberg Area: Kenrose Preserve

The third area I used in this study was Kenrose Preserve, a deciduous forest area on the Helderberg plateau. It is the property of The Nature Conservancy and is located in the Rensselaerville Quadrangle (U.S.G.S.) in West Berne, New York, west of Albany (42° 36'N, 74° 12'W). Although the whole preserve is on Hamilton shale and is completely within the Deciduous Forest Formation (including Hemlock-hardwoods, Braun, 1950), there is much variation in tree composition. Forest types include oak-hickory, beech-maple, hemlock, and other combinations of dominants. The elevation range is from 1120–1500 ft (335–457 m).

The vascular flora of Kenrose Preserve was studied quite extensively in 1968-69 by Carl George, Robert Carlson and their students (unpublished manuscript). They set up permanent quadrats for the purpose of establishing a base line for future vegetation studies. Some of their vascular plant and environmental data are used in conjunction with my bryophyte data in the present study.

Field Methods

Adirondacks

Quadrats were set up on both Whiteface and Ampersand Mountains at 400 foot (122 m) elevation intervals beginning at 1600 ft (488 m), with two quadrats at each elevation. In addition, five quadrats were set up in the arctic-alpine summit area on Whiteface. The quadrat size was five by eight meters. I selected this large quadrat size because it was adequate for sampling vascular ground flora as well as bryophytes, and also because bryophytes were rather sparsely distributed at some elevations. With the large quadrats, I was able to compare bryophyte cover at different elevations and in different forest types.

As it was not possible to place transects straight up the mountains, quadrats were placed perpendicular to and at a predetermined distance from the trail, where the trail reached the selected elevations. At these distances, eight meters on Whiteface and 15 meters on Ampersand, there were no apparent disturbance effects of the trails. Because quadrats were regularly placed, there was no possibility of choosing them either for bryophytes or forest type, except as these are influenced by elevation, the independent variable in the study. Quadrats were delineated with iron spikes and copper wire and are relocatable.

Quantitative methods were used to record bryophytes as well as vascular plants. Vascular plants were counted as individuals in all quadrats except those on

the summit of Whiteface (see below). For some plants, e.g., *Ribes glandulosa*, it was difficult to determine what constituted an individual. In such cases, separate stems were counted. It is rarely possible to accurately determine what constitutes an individual bryophyte plant; therefore, cover was measured for bryophytes. The area covered by each species was computed by measuring length and width, radius, or triangle base and height for variously shaped clumps. I have found these methods repeatable to within five percent accuracy. Actual measurements are more precise than estimates using a cover scale, especially since cover scale data are often converted into percentage cover by statistically questionable techniques. In addition, many bryophyte species, e.g., *Ptilidium pulcherrimum* or *Dicranum montanum*,¹ are present in numerous small pieces within a quadrat, so that cover is hard to estimate. In the summit areas of arctic-alpine flora, cover measurements were used for vascular plants as well as for bryophytes because all the plants occurring there, e.g., *Vaccinium uliginosum*, have a clumped or caespitose growth form and cannot be counted as individuals.

Studies made at only one season may underestimate total diversity. Whittaker (1965) found this to be especially true for winter ephemerals in the desert. In order to find out whether spring ephemerals were significant in the Adirondacks, I restudied several quadrats on both mountains. Spring data were compared with those of the previous summer and fall to determine the extent of seasonal diversity.

Certain specialized bryophyte habitats are not represented or are underrepresented in a large study of this type. One such habitat is that for epiphytic bryophytes, living trees. I have collected data on species richness of epiphytic bryophytes on Ampersand Mountain. The epiphyte study is discussed separately below.

Helderbergs

At Kenrose Preserve, George and Carlson had set up permanent stations and quadrats. I relocated and used 13 of their original stations, all in wooded areas. George and Carlson (unpublished data) recorded the number of individuals for each species of vascular plant, using five 12 by 48 foot quadrats at each station. They also collected soil and micro-climatic data for each station. These collected soil type, pH, and nutrient content; soil and air temperature; relative humidity, and light intensity. (For further details of the design of this original study see Slack, 1971.) In the present study, I have used 4 by 16 meter quadrats, but

¹ Names of mosses follow Crum, Steere, and Anderson, 1973, and of hepatics, Schuster, 1953.



(photo by C. J. George)

Kenrose Preserve, showing one of the slopes studied.

have collected data for the included 12 by 48 foot quadrats as well. The small extension made virtually no difference in the diversity index results; bryophytes are relatively sparsely distributed in the whole area as compared to the Adirondack sites.

At least one 4 by 16 meter quadrat was sampled for each station. At six of the 13 stations, at least two quadrats were sampled in order to compare within-station and between-station variation in diversity and species composition. Twenty quadrats were completely sampled for bryophytes, using the same cover measurements as explained above for the Adirondack quadrats. The study was set up to include pairs of stations at the same elevations so that I could determine whether elevation differences over the relatively small range of 1120 to 1510 ft (335–457 m) are statistically important determinants of diversity.

Analysis of Data

Diversity Indices

The term “species diversity” has been used for two different types of measurements. The first type, which measures species richness, is sometimes called a variety index (Auclair and Goff, 1971). It is essentially based on the number of species per area. (Gleason, 1922; Willis, 1922; Margalef, 1957; Menhinick, 1964) or on species number and a hypothetical distribution of relative abundance (Fisher, Corbet and Williams, 1943; Preston, 1948, 1962). Number of species (signified by S) is used in the present study.

The second type of index includes an evenness or equitability component in that the relative abundances of the species in the sample are included in these measures. The most commonly used of these came originally from information theory. Margalef (1957) suggested an analogy between diversity in biological communities and “information” content. The usefulness of this analogy and the biological meaning of diversity, particularly in regard to stability, has been questioned (Paine, 1969; Pielou, 1969; Auclair and Goff, 1971; Hurlbert, 1971; Goodman, 1975). The indices themselves, however, have been used in studies with many kinds of organisms as empirical measures of species richness and relative abundance of species. When used in this way the information theory type of measure is considered a “more meaningful index when used as a comparative statistic within taxonomically restricted groups” (Goodman, 1975). The index most often employed by ecologists and therefore most useful as a comparative statistic is Shannon’s formula (Shannon and Weaver, 1963):

$$H' = - \sum p_i \ln p_i \quad (1)$$

where p_i is the proportion represented by the i^{th} species. This is the diversity index I have used in the present research. Pielou (1966a, 1966b, 1969) has discussed the use and misuse of this and similar indices for different types of biological collections. The use of this form of Shannon’s index is justified in terms of the sampling methods used in this study. Several workers have compared this index and other diversity indices such as Simpson’s (1949) and McIntosh’s (1967) using the same data and found very high correlations among them (Auclair and Goff, 1971; Nicholson and Monk, 1971; Gauch, Chase, and Whittaker, 1974). It appears that in spite of somewhat different theories on the part of their authors, these indices measure essentially the same parameters.

Measures of Importance

In Shannon’s formula (1, above) the term p_i refers to the proportion of the total number of individuals (or

total biomass, cover, etc.) belonging to the i^{th} species. The number of individuals has usually been used, particularly in the study of bird diversity (e.g., MacArthur and MacArthur, 1961; MacArthur, 1964; Tramer, 1969; Recher, 1969), by other animal and plankton ecologists (e.g., Lloyd, Inger, and King, 1968; Margalef, 1968), and in most plant studies (e.g., Pielou, 1966a; Nicholson and Monk, 1974). I have used proportions of individuals for vascular plants in the present study except in the alpine quadrats. For alpine vascular plants and for bryophytes, I have used proportion of cover for each species.

Other measures of relative importance have been suggested for both animals and plants, particularly where there are large differences in size among the species sampled (Dickman, 1968). I have treated trees, shrubs, and herbaceous plants separately in most analyses, eliminating the relative size problems. Cover measurements do underestimate the importance of tall clump-forming species as compared to prostrate pleurocarpous mosses with the same cover value. It would be possible to measure height as well as area covered and compute a volume for use in the index. Alternately, one could harvest the bryophytes and use biomass (dry weight) or energy (caloric value as measured in a calorimeter). Forman (1968) has attempted to correlate cover measurements with biomass and caloric value on a species basis, but results are not entirely consistent; Bliss (1962) and Forman (1968) found somewhat different values for *Polytrichum juniperinum*, the only species used in both studies. Variations in growing conditions probably affect the cover-biomass-calorie relationships.

Biomass has been used as a measure of importance in tree diversity studies (Wilhm, 1968). Since a very high percentage of tree biomass consists of dead xylem tissue, the values are out of proportion to the present dynamics of the community. Whittaker (1965, 1970) has championed the use of productivity measurements and has used these successfully for both woody and herbaceous plants (Whittaker, 1965, 1966; Whittaker and Woodwell, 1969). From a theoretical point of view, productivity (or net photosynthesis for primary producers) per unit time is probably the best measure of the importance of a species in a community. It is, however, difficult to obtain the necessary data for a large number of different species. Tree productivity is usually estimated by using dimension analysis as Whittaker and Woodwell (1969) have done.

Productivity measurements are especially difficult to obtain for bryophytes because information on growth rates in the field is available for only a few species (Longton and Greene, 1969). Furthermore, in contrast to the situation in most vascular plants, it is often extremely difficult to ascertain what constitutes the current year's growth. Techniques worked out by Watson

(1975) for *Polytrichum* species might be useful here. Without biochemical tests involving the breakdown of chlorophylls to pheophytin, it is often impossible to tell what portion of a moss is alive, and even such tests are not discriminating in certain genera such as *Sphagnum*. Although progress is currently being made on productivity measurements for bryophytes in the Arctic, it is doubtful that these measurements will ever be feasible for as many different species as were encountered in the present study. For the present, cover measurements appear to be the best available for bryophytes for use in diversity studies. However, volume measurements may be preferable when there are striking differences in height among species. Biomass measurements of living material are perhaps equally suitable, but these require destruction of the community, or a portion of it, in the process of studying it. Such measurements have recently been used successfully for studies of epiphytes on old-growth *Pseudotsuga* (Denison, et al., 1972, Pike et al., 1975).

The Evenness Component of Diversity

Lloyd and Ghelardi (1964) and others (Kricher, 1972, Murdock, et al., 1972) have pointed out that it is desirable for some purposes to be able to isolate the relative abundance component of diversity as measured by Shannon's index. Margalef, under the subject of "redundancy," had already pointed out the importance of this component in his original 1957 paper. The ecological meaning of this evenness (or equitability) component has been the subject of considerable discussion (Sager and Hasler, 1969; Tramer, 1969; Hill, 1973). Some of this discussion concerns the relationship between the evenness component of diversity and opportunistic versus equilibrium species groups. This question will be explored further in conjunction with my results for bryophytes.

The measure for evenness used in the present research is

$$J' = H'/H'_{\max} \quad (2)$$

where $H'_{\max} = \log_e S$. Pielou (1966a) suggested using $H'/H'_{\max}$ to measure evenness of distribution of species abundance, and Tramer (1969) subsequently called it J' . J' is not based on any hypothetical ecological maximum for evenness, and has the further advantage of being the most widely used measure; therefore, comparisons can be made with other research.

(Note: $H'_{\max}$ represents the maximum possible diversity for a given number of species (S); i.e., the value of H' if all species were equally abundant. For further discussion of this and other evenness or equitability measures see Slack, 1971.)

Comparison of Species Composition

Diversity indices themselves cannot tell us anything about changes in the actual species composition. We may find, using Shannon's formula, that the diversity of bryophytes is almost the same for quadrats at 1600 ft (490 m) and at 4000 ft (1220 m) on Whiteface Mountain, but this gives no information about floristic similarity at the two elevations. Southwood (1964) reviewed a number of indices for comparing faunas (or floras) over space or time. Two types of indices have been used. One group, collectively called Coefficients of Community, are based solely on species presence. These include those of Jaccard (1922), Kulezynski (1928) and Sørensen (1948). The latter, a variant of Jaccard's, as pointed out by Dahl (1960), has been most often used:

$$\text{Sørensen's Quotient of Similarity (Q.S.)} = \frac{2w}{m + n} \quad (3)$$

in which m is the total number of species in the first sample (or quadrat), n the total number in the second, and w the number of species common to both samples

The second type of index uses the relative abundance of the species in the sample, not merely their presence, in making comparisons. In so doing it tends to emphasize the importance of dominant species in weighting similarity between samples. An often used measure of this type is the Percentage of Similarity (Raabe, 1952)

$$\text{Percentage of Similarity} \\ (\% \text{ Sim.}) = \sum \min(a, b, \dots x) \quad (4)$$

where $\min$ = the lesser of the two percentage compositions for species $a, b, \dots x$ in the two samples. For example, given the following percentage compositions or two quadrats A and B having species a, b , and c :

| | a | b | c | | a | b | c |
|----------|-----|-----|-----|----------|-----|-----|-----|
| case 1 A | .95 | 0 | .5 | case 2 A | .95 | 0 | .5 |
| B | .20 | .75 | .5 | B | .75 | .20 | .5 |

the % Sim for case 1 = .20 + 0 + .5 = .25
whereas Sørensen's Q.S. = $2(2)/5 = .80$

the % Sim for case 2 = .75 + 0 + .5 = .80
whereas Sørensen's Q.S. remains the same

Thus it can be seen that the Percentage of Similarity index (4) rates as most similar those samples (quadrats) that have similar dominants. In this example, Sørensen's index (3) appears to overvalue the rare species

(species c in both cases 1 and 2 above) as pointed out by Whittaker and Fairbanks (1958). This is not always so, however. A large number of rare species can give low Sørensen values as compared with Percentage of Similarity for the same quadrats. Comparison of the two types of indices have been made by Kontkanen (1950) for leafhoppers and by Whittaker and Fairbanks (1958) for freshwater plankton. Kontkanen found the Coefficient of Community type of index more satisfactory; Whittaker and Fairbanks, the Percentage of Similarity. The group of organisms with which one is working is probably the important factor.

I have used both Sørensen's index and Percentage of Similarity as well as two variants of Sørensen's with my data. These variants involve the calculation of Sørensen's index using only those species which, respectively, constitute at least 1 percent (referred to as Sør. .01) and at least 5 percent (Sør. .05). The objective was to compare the effectiveness of all four methods in evaluating floristic similarity. The latter two methods evaluate the effect of the inclusion of rare species. Cluster analysis was used to compare these measures of floristic similarity. The method used was essentially a modification of Harmon's B-coefficient (Fruchter, 1954; Slack, 1971).

In addition to the above methods, which all compare quadrats in pairs, I have used a method of Dahl's (1960) to compare the vegetation, both bryophyte and vascular, of Whiteface Mountain with that of Amper-sand Mountain, and the vegetation of both Adirondack sites with that of the Kenrose Preserve. The deciduous forest, spruce-fir forest, and arctic-alpine vegetation were compared both within and among the areas (Slack, 1971).

Taxonomic Diversity

A question was raised in the introduction as to whether all species are ecological equivalents in terms of diversity; e.g., is a bryophyte community with three species of *Polytrichum* (or *Sphagnum*, or *Dicranum*) as dominants as diverse as one having three dominants each belonging to a different genus? One way in which this question can be examined is in terms of niche separation; congeneric species with widely separated niches can, it seems to me, be considered ecological equivalents of species in different genera in terms of diversity. Congeneric bryophytes in genera such as *Dicranum*, *Polytrichum*, *Grimmia*, and *Brachythecium* were found in the same quadrats in this study. I have examined these genera in regard to possible niche separation.

Quantitative analyses of taxonomic diversity can also be made. I have calculated the number of congeneric species in a quadrat in relation to the total number of species in that quadrat. In bird studies (Grant, 1969), the proportion of congeners has been found to vary di-

rectly with the total number of species; it was not known whether this was true for bryophytes.

In addition, total species diversity (H') for bryophytes in each quadrat has been partitioned into specific, generic, and familial portions, as was done by Lloyd, Inger, and King (1968) for frogs, lizards, and snakes in the Borneo rain forest. These calculations are subject, of course, to decisions of taxonomists as to what constitutes a genus or a family. Family lines in particular are in considerable dispute for bryophytes, and some larger genera have been especially subject to splitting, for example, *Lophozia*, *sensu latu*. Species lines are in general less of a problem with most genera of bryophytes. Hybridization appears to be uncommon in bryophytes (Khanna, 1962; Williams, 1966).

Gradient Analysis

The major gradient used in this study was elevation. Changes in bryophyte and vascular plant vegetation were analyzed in relation to elevation. These changes included the following: changes in species richness (S) and in species diversity (H'); changes in species composition; changes in relative cover of bryophyte species. Comparisons of species composition at different elevations were made by using Sørensen's and Percentage Similarity indices as explained above. Other methods were graphical and are self-explanatory.

Multiple Regression Analysis

Multiple regression analyses were carried out in regard to determinants of species richness in bryophytes both for New York State as a whole (see following section) and for Kenrose Preserve. In Kenrose Preserve, a large number of abiotic and biotic factors were used in the regressions. A stepwise multiple regression program (STEPREGI: SUNYA code: STAT/02) was used. Correlation coefficients between bryophyte diversity (H') and environmental and other parameters were also calculated.

Bryophyte Diversity in New York State

Bryophyte diversity in the whole was examined by means of a multiple regression analysis of data from Ketchledge's (1957) checklist of mosses of New York State. Since there are no comparable data for hepatics, this analysis is restricted to mosses. The checklist gives the moss species present in each of the districts of New York State (see fig. 2) as determined from herbarium and field studies. These data are largely free of taxonomic problems; the specific status of only a few

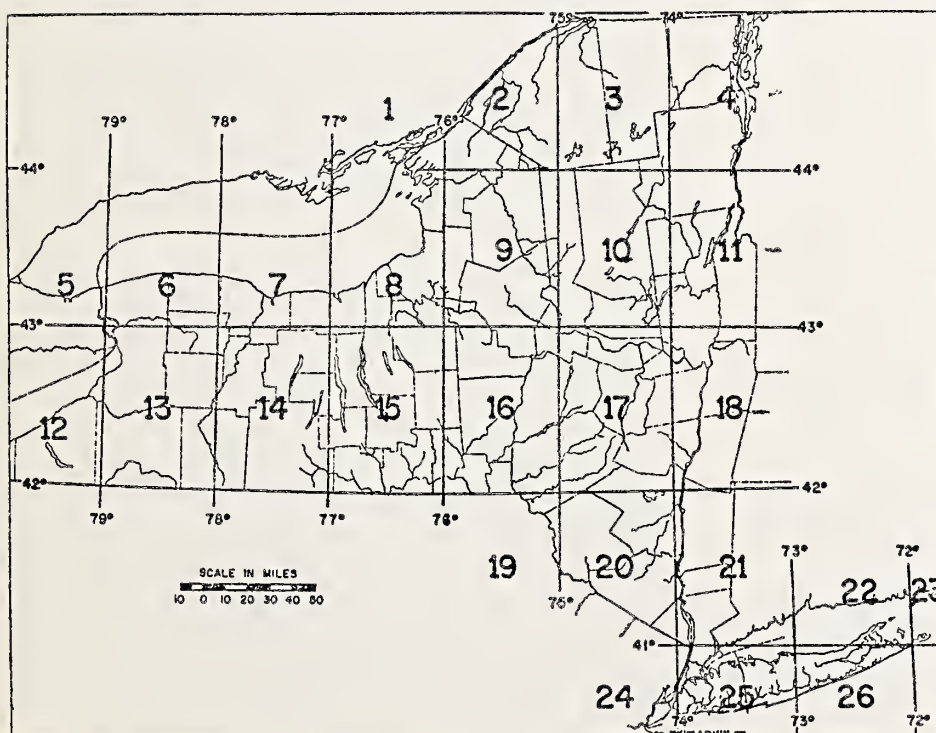


FIGURE 2 Floristic districts of New York State, from Ketchledge, 1957.

taxa is in doubt. Some of the districts, however, had been better explored than others, for example, those close to New York City and to Cornell University. Moreover, additional species have since been discovered for various districts, including a few that I found in the three districts involved in my studies. Nevertheless, these are probably the best data of this sort available for American bryophytes.

The parameters used in the linear regression analysis of these data were latitude, area, and the range of elevations within one district. The range of elevations ("elevation range" on the table) was obtained from topographic maps (USGS) of the State. Areas of districts were determined by planimeter measurements from State roadmaps.

Results of the multiple regression analysis are shown in table 1. In this table r^2 and R^2 are the coefficients of determination and multiple determination, respectively. It can be seen that range of elevation acts as a major determinant ($r^2 = 0.5159$) of moss diversity in terms of species richness (S). Area adds very little as a determinant ($R^2 = 0.5665$).

TABLE 1
Coefficients of Determination (r^2) and
Coefficients of Multiple Determination
(R^2) from Multiple Regression Analysis
based on Checklist of the
Mosses of New York State

| Parameters | r^2 | R^2 |
|---|--------|--------|
| Area | 0.3745 | |
| *Latitude | 0.0001 | |
| Area with Latitude | | 0.3748 |
| Elevation Range | 0.5159 | |
| Elevation Range with Area | | 0.5665 |
| Elevation Range
with Area and Latitude | | 0.5679 |

*Latitude is not a significant variable.

Although there is a latitude range of almost five degrees in New York State, latitude is of no importance as a predictor of diversity ($r^2 = 0.0001$). A few species may be affected by latitude. *Pogonatum brachyphyllum*, a coastal plain species is found only as far north as Long Island, and there are old records for such southern species as *Syrrophodon floridanus* and *S. texanus* in the southernmost districts (Ketchledge,

1957). Two far northern species, *Aulocomnium turgidum* and *Conostomum tetragonum* are found in a northern district, but at elevations over 5000 ft (1525 m). Their presence is almost certainly an effect of elevation, not latitude; no unusual species are found in the northwestern districts of the State, which are at the same latitude but do not include the higher elevations.

Area has surprisingly little value as a predictor of species richness, in contrast to the results of other studies, particularly island studies, in which area was the most important predictor. These include bird studies (Hamilton, Barth, and Rubinoff, 1964) and vascular plant studies (Johnson, Mason, and Raven, 1968; Slack and Nicholson, in preparation). Hamilton, et al., (1963) did find elevation more important than area for vascular plants of the Galápagos, but this conclusion has been questioned (Johnson and Raven, 1973) because of the inadequacy of the plant data used. Vuilleumier (1970) studied bird species richness on continental "islands," páramo vegetation on isolated mountain tops. He, too, found area, together with distance from the source, the important predictors of species richness.

Since this is not an island study, distance from the source of the vegetation is probably not a factor in New York State. It probably is a factor, however, in comparing species richness of bryophytes in New York and in the Southern Appalachians, or for example, in the Adirondacks and the Southern Blue Ridge (Slack, 1976). Larger area provides a larger target size for propagules and also more spacial heterogeneity, resulting in a wider range of habitats. The problems of immigration and establishment, so important for island species, are less important for bryophytes in New York State as a whole, except for species restricted to special "islands." Principles of island biogeography do apply to *Sphagnum* and hepatic species restricted to bogs and to those bryophytes found in tundra areas above timberline on Adirondack high peaks. (From my own experience this seems to be true. More arctic-alpine species of both vascular plants and bryophytes are found on the extensive tundra areas of Marcy and Algonquin than on peaks with less extensive areas. More *Sphagnum* species are found in the extensive Bloomingdale Bog area than in smaller bogs. Specific data are needed, however.) Apart from these special circumstances, it can be seen that area alone is not the important determinant by examining adjacent districts of essentially equal area—districts 14, 15, 16, and 17 (see fig. 2). Species richness varied in these districts from 102 to 281 species. Three of the smaller districts (4, 11, and 18), on the other hand, are among the five having the highest number of species in the State.

As shown in table 1, range of elevation was the best determinant of moss diversity. Those districts with the greatest elevation range, districts 3, 4, and 17 in the Adirondack and Catskill Mountains, all had high numbers of species—180, 266, and 281, respectively. Two of these districts were used in the present study in order to investigate further and more specifically the effect of elevation in relation to both moss and liverwort diversity. Another indication of this relationship within an area comes from a survey of the literature on latitudinal diversity of bryophytes (Slack, 1971). The number of bryophyte species reported for 31 different geographical regions at all latitudes was given together with the area of each region. Although the data for many of these areas, especially tropical ones, are admittedly incomplete, a number of tentative conclusions could be drawn. The one relevant here was that species richness is greater in regions of greater elevation range and low evapo-transpiration rates. Two more recent publications, giving compilations of the mosses of Japan (Iwatsuki and Noguchi, 1973) and of the Southern Blue Ridge of southeastern United States (Anderson and Zander, 1973) further substantiate these conclusions.

The regression analysis leaves a large part of the variance in species richness unexplained. It seems likely that a variable indicating the amount of bryological exploration for each district up to 1957 would have been helpful. When a new checklist is published with data collected since 1957, this analysis should be re-run. In addition, climatic factors such as annual precipitation (or precipitation in relation to temperature) could be added to the analysis. Variables indicative of spatial heterogeneity, such as types of rock outcropping, might also be important.

That elevation range is an important determinant of hepatic as well as moss diversity has been brought out in the field studies I conducted in New York State. The results of these studies will now be presented.

Results of the Adirondack Studies

Summary of Results

The results of the field studies, outlined here, are discussed in more detail under the separate headings below. A greater diversity of bryophytes occurred in a larger range of elevations. Increased overall diversity largely resulted from changes in species composition of bryophytes with change in elevation and, therefore, with forest type. Throughout the elevation range, species composition changed with increasing elevation difference between the quadrats sampled. Although a

few species occur throughout the elevation range, I identified several distinct distribution patterns for bryophyte species by plotting their relative abundance at different elevations. Both species present and abundance varied with elevation. Species composition of bryophytes in deciduous forest was similar both between quadrats on one mountain and between mountains; this was true, but to a lesser extent, for coniferous forest. Arctic-alpine quadrats showed considerable variation in species composition, and almost no similarity existed between arctic-alpine and coniferous forest bryophyte communities.

Diversity, whether measured by S or H' (see page 8), showed different patterns along the elevation gradient for each of the plant groups studied: bryophytes, trees, shrubs, tree seedlings, and herbaceous vascular plants. S and H' also showed somewhat different patterns for any one group. For bryophytes, H' changed very little up to 3600 ft (1100 m). High elevation balsam fir quadrats with late snow cover showed highest diversity (both S and H') largely because of an increase in the number of species of hepatics. Both mean and maximum number of moss species per quadrat were similar for deciduous and spruce-fir forest, but lower in the arctic-alpine quadrats. For hepatics, species richness was higher in the coniferous than in deciduous forest, and lowest in the arctic-alpine summit quadrats although some species are restricted to this elevation.

In the deciduous forest at 1600 ft (490 m), S and H' were about equal for bryophytes and for all vascular plants together; at all other elevations, bryophyte diversity was higher than that of vascular plants.

The evenness component of diversity (J') varied greatly; in some circumstances extreme dominance by one species resulted in very low J' and lower H' values. Most of the J' values were lower than reported by other investigators for birds and for vascular plants.

Diversity was not correlated with bryophyte cover (a long-term measure of productivity) for the whole elevation range. There is some indication, however, substantiated by the Kenrose results (see page 40), that within a deciduous forest area, H' is positively correlated with total percent of bryophyte cover.

An inverse relationship was found between shrub and tree diversity and that of bryophytes, indicating interaction between these groups of plants. Competitive interaction between a bryophyte, *Pleurozium schreberi* and an herbaceous plant species, *Oxalis montana* was also studied.

Seasonal diversity, the epiphyte study made on Ampersand Mountain, and taxonomic diversity are each discussed separately below.

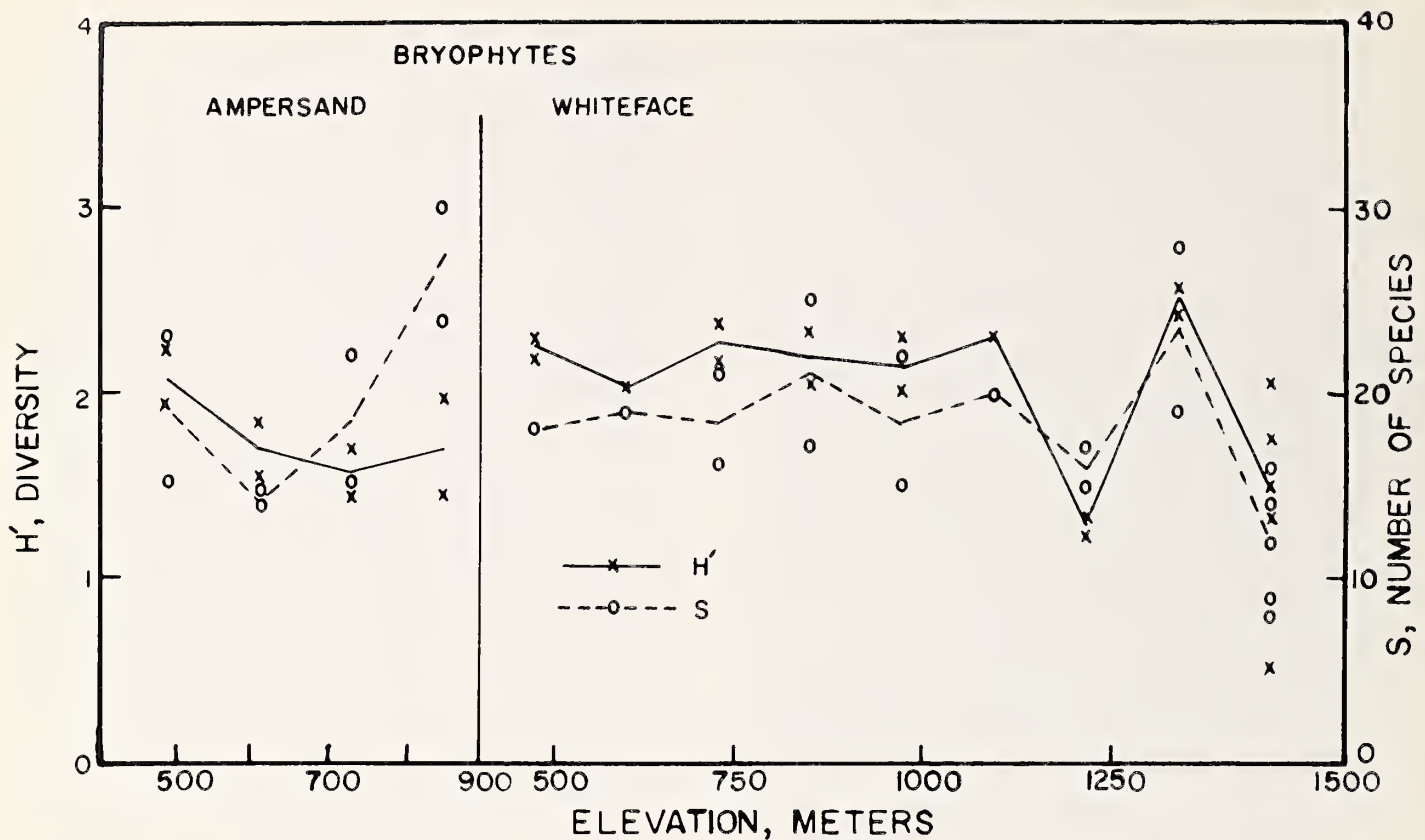


FIGURE 3 Changes in species richness (S) and diversity (H') with elevation for bryophytes at Whiteface and Ampersand Mts.

Elevation in Relation to Diversity

Figure 3 shows changes in species diversity in terms of species richness (S) and for the Shannon function (H'). The latter contains an evenness component as explained above. Data for Ampersand and Whiteface Mountains are shown separately. H' is seen to change surprisingly little from 1600 ft (490 m) to at least 3600 ft (1100 m) on Whiteface. At 4000 ft (1220 m) there was a sharp drop in H' with, however, little change in the number of species, S. The low diversity (H') is due here to the high dominance of one species, *Pleurozium schreberi*, which accounts for 59 to 67 percent of the total bryophyte cover. The resulting evenness values are very low, $J' = 0.44$ to 0.49 .

At 4400 ft (1340 m) on the other hand, both H' and S increase. At that elevation, where there is dense *Abies balsamea* forest and very late snow cover until mid-June or later, an unusually high number of hepatic species increase the diversity.

I studied additional quadrats at these elevations after the completion of the main study to determine whether the findings at these two elevations might be chance effects of sampling. Very similar results were obtained in this resampling at the same elevations:

4000 ft (1220 m): first sampling $H' = 1.33$
second sampling $H' = 1.25$

4400 ft (1340 m): first sampling $H' = 2.63$
second sampling $H' = 2.41$

The latter value (2.41), though not as high as in the first quadrat at 4400 ft, is nevertheless higher than that for any other elevation in the whole study.

The arctic-alpine quadrats vary greatly in diversity (H'). Many factors such as microtopography, slope aspect, wind exposure, snow and water retention changed over very short distances on the summit of Whiteface, producing a mosaic of vegetation. These factors are important in determining the vegetation types, both on Whiteface (Nicholson, 1969) and in the alpine communities of the White Mountains (Bliss, 1963). In general, both H' and S are lower than in the deciduous forest or the spruce-fir, or in pure fir at 4400 ft (1340 m), but considerable variation was found



(photo by A. B. Wellborn)

Author working in krummholz zone, Whiteface Mountain. *Andreaea rupestris* on rock in foreground.



(photo by A. B. Wellborn)

Bryophyte-lichen mat over rock, arctic-alpine zone, Whiteface Mountain.

both in numbers of species and in dominance relationships. Evenness (J') varies from 0.25 to 0.80 for two summit quadrats with almost the same number of species ($S = 9,8$) resulting in diversity indices (H') of 0.55 and 1.66, respectively. The bryophytes are important members of the plant communities on the summit is shown by the fact that the percent of bryophyte cover averages 20 percent.

Ampersand Mountain also shows little change in diversity (H') with elevation, except that the highest diversity occurs at 1600 ft (940 m), an elevation where there is mature hemlock-northern hardwoods forest. Species richness (S) is similar to that of Whiteface quadrats at the same elevations, and is even higher at 2800 ft (850 m). H' values are lower than on Whiteface, however, because of high dominance,

FIGURE 4 Changes in mean species richness (S) of mosses and liverworts with elevation and forest type for Whiteface and Ampersand Mts.



especially at 2400 ft (730 m) and 2800 ft (850 m), both of which are in the spruce-fir zone.

Figure 4 shows changes in species richness (S) with elevation for mosses and liverworts separately. (Data for Whiteface and Ampersand Mountains are combined.)

One can see that for mosses little difference exists between the deciduous and the spruce-fir forest. Mean species richness (S), however, decreases greatly from the spruce-fir to the arctic-alpine zone. The maximum number of species drops also, from 20 to 10. For liverworts, however, mean species richness (S) increases significantly between deciduous and spruce-fir forest (see fig. 4), from a maximum of six in the deciduous to 11 per quadrat in the spruce-fir. Higher humidity, lower light intensity and persistent snow cover may all contribute to the higher liverwort diversity, especially under the pure *Abies balsamea* at 4400 ft (1340 m). The summit quadrats show the lowest mean number of species with few or no liverworts in the drier, rockier quadrats. Several liverwort species, however, often with relatively high cover value, are found in wetter, more protected parts of the summit area. Such liverworts as *Gymnocolea inflata*, *Anastrophylum michauxii*, *Lophozia ventricosa*, *Ptilidium ciliare* and *Scapania nemorosa* add considerably to the diversity of arctic-alpine quadrat 21, just northeast of the summit.

Changes in Species Composition with Elevation

The original hypothesis, that bryophyte diversity is higher when a greater range of elevation is included in the analysis, was tested and appears to be tenable for the State as a whole. This is based on the results of the multiple regression analysis, for the elevation range of the Adirondack study, 1600 to 4800 ft (490 to

1460 m). The hypothesis assumes that species composition changes along this gradient. Two techniques of direct gradient analysis (Whittaker, 1968, 1970) were used to test this hypothesis. Since the first of these involved using a similarity value for comparison of species composition between quadrats at different elevations, the results of the comparison of four such similarity measures are presented first.

The four methods used to compare species composition were Sørensen's Q.S., Percent Similarity, and Sørensen's using only those species having at least five percent cover and one percent cover, respectively (see Analysis of Data section). I compared these four methods, using data from all three areas and all five plant types. I also made comparisons for various combinations of plant types, for example, shrubs, seedlings, and ground flora. Results presented here, however, refer to bryophytes on Whiteface and Ampersand Mountains, unless otherwise stated. Percentage Similarity and Sørensen's Q.S. values for all combinations of Adirondack quadrats are shown in table 2. Table 3 below shows correlation coefficients between the methods.

TABLE 3

| Similarity Methods Compared | Corr. Coeff. |
|--|--------------|
| Percentage Similarity and Sørensen's Q.S. | 0.79 |
| Percentage Similarity and Sørensen's (.01) | 0.85 |
| Percentage Similarity and Sørensen's (.05) | 0.87 |

Correlation coefficients among these indices for trees, shrubs, and tree seedlings were equally high whereas those for ground flora were somewhat lower. Correlation (0.87) is especially high between Percentage Similarity and Sørensen's (.05), in which species with less

TABLE 2

SOERENSON INDICES (TOP RIGHT) AND PERCENTAGE OF SIMILARITY (BOTTOM LEFT) BETWEEN PLOTS

| | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. | 14. | 15. | 16. | 17. | 18. | 19. | 20. | 21. | 22. | 23. | 24. | 25. |
|----|------|
| 1 | .000 | .421 | .341 | .439 | .263 | .378 | .238 | .263 | .267 | .227 | .154 | .298 | .226 | .286 | .250 | .178 | .263 | .279 | .158 | .314 | .000 | .057 | .054 | .063 | .000 |
| 2 | .289 | .000 | .485 | .485 | .600 | .483 | .294 | .267 | .378 | .389 | .258 | .256 | .311 | .412 | .375 | .324 | .333 | .229 | .200 | .326 | .000 | .074 | .069 | .083 | .000 |
| 3 | .208 | .374 | .000 | .556 | .424 | .438 | .378 | .242 | .400 | .462 | .412 | .333 | .333 | .432 | .400 | .400 | .364 | .316 | .242 | .478 | .059 | .133 | .125 | .148 | .077 |
| 4 | .185 | .279 | .530 | .000 | .545 | .500 | .378 | .182 | .350 | .359 | .353 | .238 | .250 | .432 | .514 | .400 | .424 | .263 | .303 | .478 | .059 | .133 | .063 | .074 | .000 |
| 5 | .104 | .310 | .227 | .182 | .000 | .483 | .294 | .400 | .486 | .333 | .323 | .410 | .444 | .529 | .438 | .432 | .533 | .343 | .400 | .465 | .000 | .148 | .069 | .083 | .000 |
| 6 | .163 | .312 | .194 | .238 | .284 | .000 | .242 | .207 | .278 | .400 | .200 | .263 | .273 | .424 | .323 | .278 | .483 | .235 | .207 | .333 | .000 | .154 | .071 | .087 | .000 |
| 7 | .136 | .357 | .365 | .365 | .150 | .429 | .000 | .059 | .341 | .500 | .743 | .093 | .204 | .316 | .500 | .293 | .353 | .256 | .118 | .340 | .057 | .129 | .121 | .214 | .074 |
| 8 | .043 | .038 | .039 | .024 | .359 | .269 | .003 | .000 | .432 | .111 | .065 | .513 | .489 | .294 | .188 | .270 | .267 | .457 | .400 | .372 | .065 | .074 | .138 | .083 | .000 |
| 9 | .092 | .125 | .119 | .125 | .182 | .239 | .220 | .491 | .000 | .233 | .316 | .348 | .385 | .439 | .359 | .364 | .378 | .429 | .324 | .520 | .105 | .118 | .167 | .065 | .000 |
| 10 | .157 | .271 | .322 | .298 | .167 | .227 | .332 | .003 | .078 | .000 | .541 | .133 | .196 | .350 | .421 | .279 | .333 | .146 | .111 | .286 | .054 | .061 | .114 | .200 | .069 |
| 11 | .120 | .253 | .287 | .315 | .115 | .199 | .392 | .003 | .091 | .702 | .000 | .100 | .174 | .229 | .424 | .263 | .387 | .222 | .129 | .318 | .063 | .071 | .133 | .240 | .083 |
| 12 | .016 | .086 | .019 | .033 | .441 | .230 | .003 | .434 | .151 | .008 | .004 | .000 | .704 | .419 | .293 | .348 | .308 | .500 | .359 | .462 | .100 | .167 | .105 | .061 | .063 |
| 13 | .010 | .033 | .057 | .040 | .090 | .098 | .023 | .136 | .077 | .039 | .020 | .313 | .000 | .490 | .255 | .462 | .400 | .480 | .400 | .483 | .087 | .143 | .182 | .103 | .053 |
| 14 | .132 | .253 | .410 | .300 | .314 | .257 | .276 | .083 | .144 | .246 | .237 | .102 | .101 | .000 | .444 | .585 | .647 | .462 | .471 | .596 | .057 | .258 | .061 | .000 | .000 |
| 15 | .145 | .367 | .360 | .342 | .259 | .426 | .511 | .007 | .088 | .328 | .232 | .017 | .042 | .504 | .000 | .462 | .438 | .270 | .188 | .489 | .182 | .138 | .194 | .154 | .080 |
| 16 | .030 | .149 | .221 | .159 | .252 | .199 | .129 | .183 | .233 | .123 | .095 | .123 | .094 | .496 | .339 | .000 | .649 | .571 | .378 | .640 | .316 | .353 | .389 | .258 | .200 |
| 17 | .047 | .113 | .123 | .175 | .173 | .267 | .143 | .187 | .187 | .121 | .155 | .189 | .159 | .387 | .182 | .304 | .000 | .514 | .400 | .605 | .194 | .296 | .276 | .250 | .174 |
| 18 | .033 | .145 | .248 | .118 | .256 | .169 | .130 | .245 | .130 | .097 | .094 | .293 | .194 | .282 | .151 | .240 | .457 | .000 | .629 | .625 | .222 | .375 | .235 | .138 | .071 |
| 19 | .024 | .031 | .074 | .037 | .107 | .089 | .013 | .156 | .098 | .013 | .013 | .146 | .173 | .115 | .019 | .092 | .561 | .607 | .000 | .512 | .129 | .222 | .069 | .000 | .000 |
| 20 | .045 | .118 | .120 | .173 | .198 | .268 | .109 | .243 | .271 | .065 | .079 | .243 | .178 | .313 | .144 | .292 | .427 | .375 | .341 | .000 | .227 | .200 | .190 | .162 | .111 |
| 21 | .000 | .000 | .002 | .001 | .000 | .000 | .001 | .005 | .010 | .004 | .027 | .020 | .009 | .029 | .005 | .227 | .039 | .059 | .030 | .033 | .000 | .429 | .600 | .320 | .333 |
| 22 | .004 | .007 | .005 | .010 | .008 | .010 | .011 | .007 | .011 | .003 | .003 | .022 | .015 | .042 | .011 | .057 | .237 | .281 | .228 | .062 | .354 | .000 | .385 | .190 | .200 |
| 23 | .001 | .008 | .010 | .008 | .003 | .008 | .009 | .007 | .016 | .012 | .035 | .020 | .011 | .028 | .012 | .074 | .047 | .060 | .028 | .039 | .347 | .195 | .000 | .522 | .455 |
| 24 | .001 | .001 | .002 | .001 | .001 | .001 | .004 | .001 | .001 | .006 | .006 | .006 | .006 | .000 | .001 | .014 | .008 | .007 | .000 | .003 | .263 | .560 | .253 | .000 | .824 |
| 25 | .000 | .000 | .002 | .000 | .000 | .000 | .001 | .000 | .000 | .004 | .027 | .016 | .005 | .000 | .001 | .072 | .011 | .018 | .000 | .003 | .156 | .041 | .199 | .161 | .000 |

CORRELATION COEFFICIENT BETWEEN SOERENSON INDEX AND PERCENTAGE STABILITY = .754



(photo by A. B. Wellborn)

Pleurozium schreberi, dominant moss of the forest floor, spruce-fir zone, Whiteface Mountain (see fig. 8).



(photo by A. B. Wellborn)

(closeup of above)

than 5 percent cover value were eliminated. The Percentage Similarity measure not only stresses dominance but also effectively ignores species of low cover value. These species are not necessarily rare, however; *Tetraphis pellucida*, for example, occurs in 12 different quadrats, but in only three of these is its relative cover value greater than five percent. This moss is an important member of the bryophyte community, occurring very regularly on decaying stumps, but rarely in large quantities since its substrate is limited. Thus the Percentage Similarity index may ignore a frequent species with a highly specific niche but low cover value. Sørensen's index, on the other hand, is said to overvalue rare species. This is not true where the rare species differ in the quadrats compared; different rare species lower the Sørensen index, but have no effect on Percentage Similarity.

The relatively high correlation (0.79) between Sørensen's Q.S. and Percentage Similarity arises from the fact that, in general, bryophytes do not show very high dominance; where dominance is not unusually high, the two methods give similar results. High dominance exists in two very different habitats in this study. In the spruce-fir forest, particularly at higher elevations under fir, carpets of *Pleurozium schreberi* accounted for up to two-thirds of the total bryophyte cover. Percentage Similarity is unusually high here (0.784). Similar unispecies bryophyte carpets occur in conifer forest elsewhere. For example, *Hylocomium splendens* forms such carpets in northern Sweden as does *Tomenthypnum nitens* in western Alberta. Unusually high dominance also occurs in some of the arctic-alpine quadrats, particularly those in which conditions are particularly rigorous. A comparison of arctic-alpine quadrats 22 and 24 in table 2, for example, shows a Sørensen's Q.S. of 0.190, but Percentage Similarity of 0.560. The high Percentage Similarity results from the dominance of one species, *Polytrichum strictum* (formerly *P. juniperinum* var. *gracilius*) which comprises 55 percent and 84 percent of the total bryophyte cover in the two quadrats. On the other hand, a comparison of quadrat 24 with another arctic-alpine quadrat, 25, gives a very different result, Sørensen's 0.824, Percent Similarity only 0.161. In this case, seven of the ten species are found in both quadrats, but the dominance relationships in the two quadrats are completely different.

These indices are used in examining the following important aspects of community structure:

- 1) Which species have physiological tolerances that enable them to grow at certain elevations?
- 2) How is niche space divided up within a community?



(photo by A. B. Welborn)



(photo by N. G. Slack)



(photo by N. G. Slack)

TOP LEFT:

Ground flora, Ampersand Mountain, with *Aralia nudicaulis*, *Oxalis montana*, seedlings of *Acer saccharum*, *A. spicatum* and *A. pennsylvanicum*.

TOP RIGHT:

***Acer saccharum*, dominant canopy tree, deciduous forest, Whiteface Mountain.**

ABOVE:

***Acer pennsylvanicum*, common understory tree, deciduous forest on Whiteface and Ampersand Mountains.**

LEFT:

***Abies balsamea* and *Picea rubens*, dominants of coniferous forest, upper slopes, Whiteface Mountain.**



(photo by N. G. Slack)

Sørensen's index, which "counts" species if they are present even in small quantities, gives better answers to the first question. Percent Similarity, stressing dominance relationships, gives better answers to the second. Therefore, I have retained both of these indices in showing changes in species composition with elevation (tables 2 and 3; figs. 5 and 6). Question 1 is discussed further below. Question 2, including dominance-diversity relationships and the division of niche space is discussed in a later section.

Both the Sørensen and Percent Similarity values have been used for comparison at the same elevation in pairs. Table 4 shows values for some elevations. (For the complete matrix for all Adirondack quadrats, see table 2.) It can be seen in table 4 that comparisons between quadrats at 1600 ft (490 m), numbers 1-4, give high values whether compared on the same mountain or between mountains. At this elevation, a relatively mature deciduous forest dominated by *Acer saccharum* occurs on both mountains. At 2400 ft (730 m), comparisons of quadrats on the same mountain (8 and 9; 10 and 11) show high similarity values; comparisons between mountains (quadrats 9 and 10; 8 and 11)

show very low values. The transition between deciduous forest and spruce-fir forest occurs at somewhat different elevations on different mountains in the Adirondacks, and even on different sides of the same mountain. At 2400 ft (730 m) there is already spruce-fir on Ampersand; on Whiteface, at least on the northeastern slope used in this study, there is still deciduous forest. The forest type is thus shown to be significant in terms of species composition of bryophytes in the ground layer.

Table 4 also shows comparisons within the spruce-fir and arctic-alpine groups of quadrats, and between quadrats of these two groups. In almost all cases within-group similarity is much higher than between-group similarity in the arctic-alpine area and those in the spruce-fir zone. The lower values for some spruce-fir quadrats using Percent Similarity results from the high dominance of one species, *Pleurozium schreberi*, in these quadrats, as pointed out above. Notable also is the complete lack of similarity (0.0) of bryophytes with either index in some comparisons of spruce-fir and arctic-alpine vegetation. (See quadrats 19 and 24, and 19 and 25 compared in table 2 and at the bottom of table 4).

TABLE 4
Bryophytes—Species Composition vs. Elevation
Ampersand (A) and Whiteface (W) Mountains

| Zone | Mountains compared | Elevations compared | Q.S. | % Sim. |
|--|--------------------|---------------------|-------|--------|
| <i>Deciduous</i>
(Quadrats 1-4) | A-A | 490 m | 0.421 | 0.289 |
| | W-W | 490 m | 0.556 | 0.530 |
| | A-W | 490 m | 0.485 | 0.374 |
| | A-W | 490 m | 0.485 | 0.279 |
| <i>Deciduous to Spruce-Fir Transition</i>
(Quadrats 8-11) | A-A | 730 m | 0.431 | 0.491 |
| | W-W | 730 m | 0.541 | 0.702 |
| | A-W | 730 m | 0.111 | 0.003 |
| | A-W | 730 m | 0.065 | 0.078 |
| <i>Spruce-Fir</i>
(Quadrats 18-20) | W-W | 1220-1340 m | 0.512 | 0.341 |
| | W-W | 1100-1340 m | 0.625 | 0.375 |
| | W-W | 1100-1220 m | 0.629 | 0.607 |
| <i>Arctic-Alpine</i>
(Quadrats 21-25) | W-W | 1460 m | 0.429 | 0.354 |
| | W-W | 1460 m | 0.600 | 0.347 |
| | W-W | 1460 m | 0.190 | 0.560 |
| | W-W | 1460 m | 0.824 | 0.161 |
| <i>Spruce-Fir-Arctic-Alpine</i>
(Quadrats 18, 19, 21, 24, 25) | W-W | 1220-1460 m | 0.221 | 0.059 |
| | W-W | 1340-1460 m | 0.129 | 0.030 |
| | W-W | 1340-1460 m | 0.000 | 0.000 |

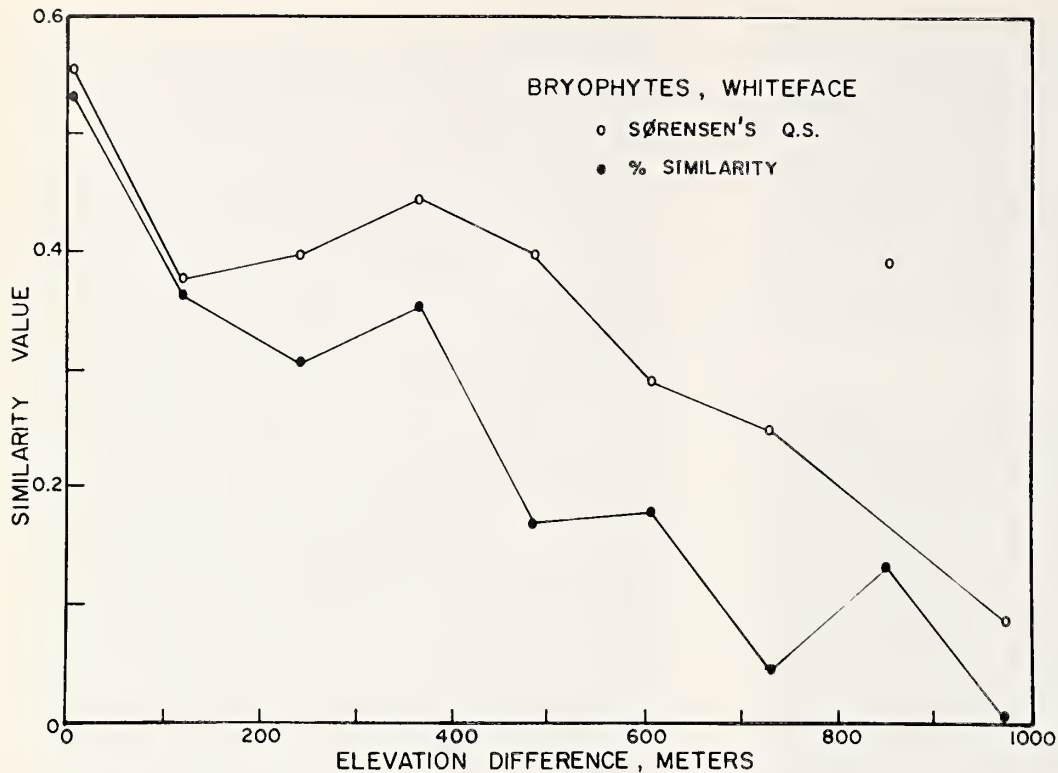


FIGURE 5 Changes in bryophyte species composition with increasing separation in elevation on Whiteface Mt.

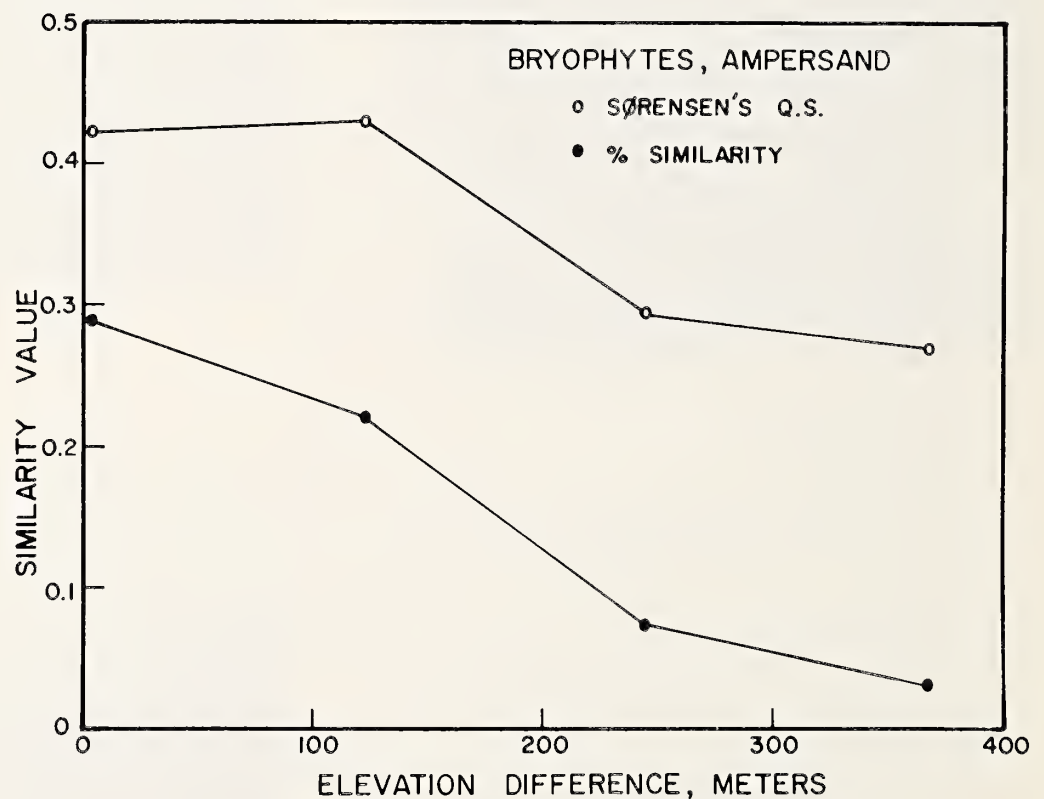


FIGURE 6 Change in bryophyte species composition with increasing separation in elevation on Ampersand Mt.

Figures 5 and 6 show changes in bryophyte species composition with increasing separation in elevation. The 0.0 separation point for both Whiteface (fig. 5) and Ampersand (fig. 6) is at 1600 ft (490 m). Thus on Whiteface (see fig. 5), the quadrats at 490 m show a

similarity of over 0.5, whichever index is used. In the spruce-fir zone, 600 m higher, the similarity with the 490 m quadrats is about 0.3 using the Sørensen, and about 0.2 using the Percent Similarity. The arctic-alpine quadrats at almost 1000 m separation from the

lowest quadrats used in this study show similarities of less than 0.1 using either index. The fact that it is not 0.0 shows that some species do occur in both the lowest and highest elevations on Whiteface, examples being *Ptilidium pulcherrimum* and *Dicranum montanum* (of fig. 12). A general decrease in similarity of species composition is seen on both mountains as the distance from the lowest quadrats increases. A sharp decrease in similarity is seen at about 250 m separation on Ampersand Mountain (fig. 6), which is the region of transition from deciduous to spruce-fir forest. On Whiteface, the greatest change occurs between 370 and 490 m separation, again at the deciduous forest to spruce-fir transition. Although forest type has been shown to be an important determinant of bryophyte species composition, Sørensen values of 0.3 or more indicate the presence of some of the same bryophyte species in both deciduous and spruce-fir forest. Many species (cf. figs. 9–12) are found in both forest types, for example, *Dicranum scoparium*, *Polytrichum ohioense*, *Plagiothecium laetum*, *Hypnum pallescens*, *Ptilidium pulcherrimum*, and even *Brotherella recurvans*, usually thought of as a spruce-fir indicator species. Like *Brotherella*, the relative cover values of most of the species change with elevation, as discussed in the following section.

Distribution Patterns of Bryophytes in Relation to Elevation

Correlation coefficients between relative cover (percent of total cover of all bryophytes) and elevation for each bryophyte species were computed. All those species which had significant correlation coefficients as well as all those that were present in at least five quadrats were used to study patterns of distribution of species on Whiteface and Ampersand Mountains. Bar graphs were made for each of these species for all quadrats on both mountains. Figures 7 to 12 show the resulting distribution patterns for representative species. The following distribution patterns were found:

- arctic-alpine (fig. 7)
- spruce-fir and arctic-alpine (fig. 8)
- entirely or predominantly spruce-fir (fig. 9)
- deciduous and spruce-fir (fig. 9)
- predominantly deciduous (fig. 11)
- deciduous, spruce-fir, and alpine (fig. 12)

In figure 7, all five arctic-alpine quadrats are shown separately so that dominance relationships in the various quadrats can be compared. Although all the bryophytes shown in figure 7 are species of specialized habitats and, to varying extents, extreme conditions, they are not all limited to arctic-alpine habitats. *Polytrichum piliferum*, for example, is found in dry, ex-

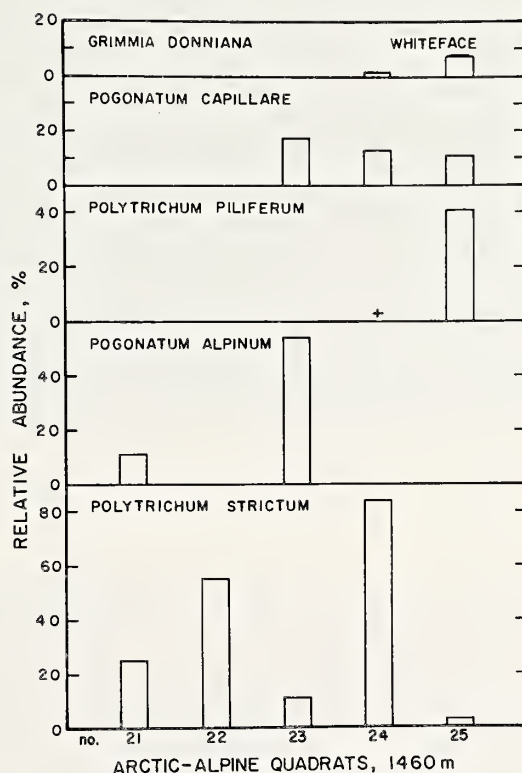


FIGURE 7 Relative abundance of species restricted to the arctic-alpine zone on Whiteface Mt.

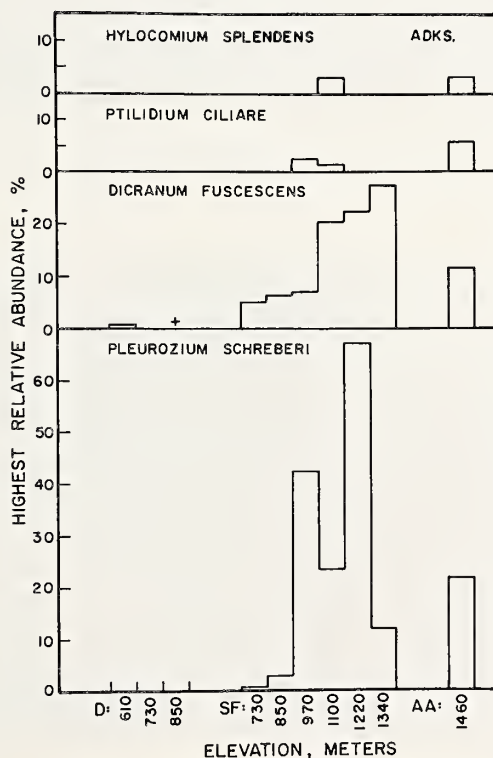


FIGURE 8 Spruce-fir and arctic-alpine

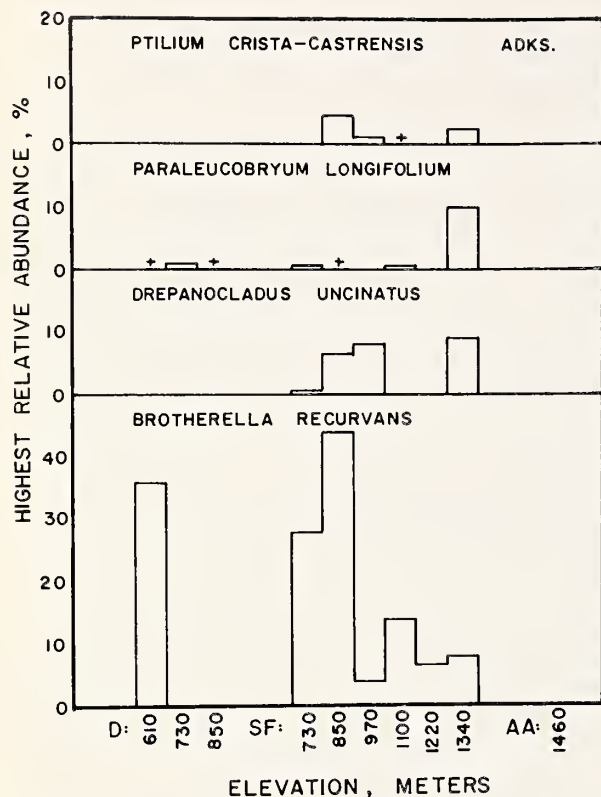


FIGURE 9 Entirely or predominantly spruce-fir

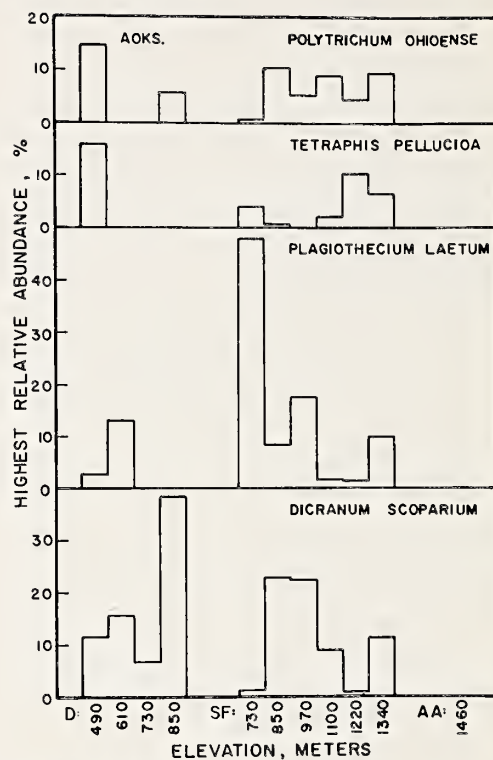


FIGURE 10 Deciduous and spruce-fir

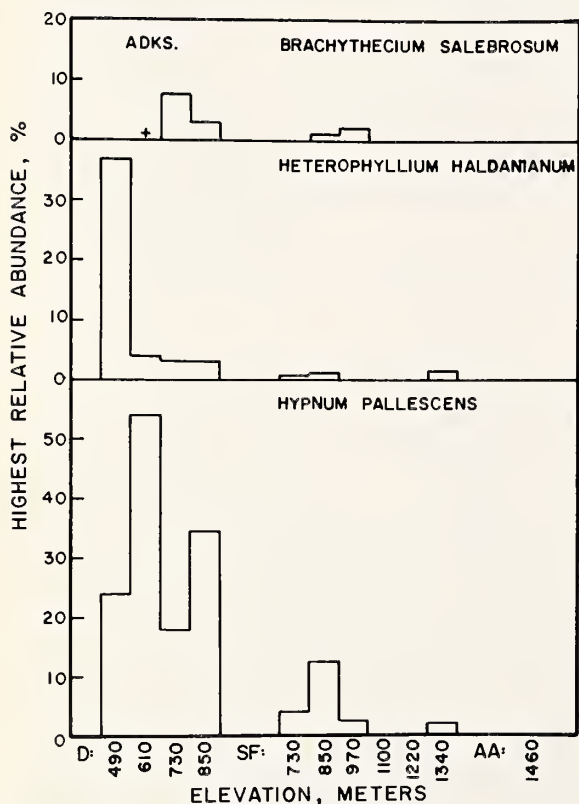


FIGURE 11 Predominantly deciduous

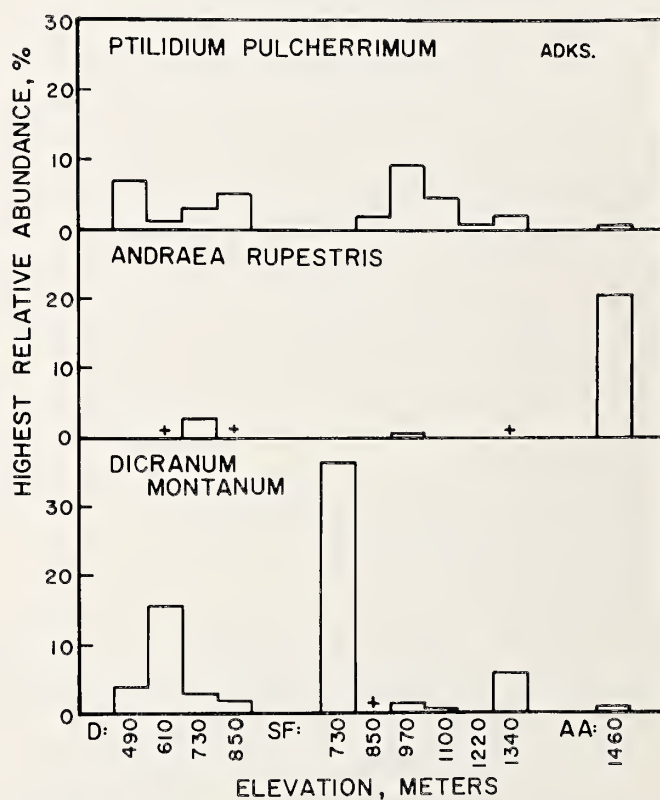


FIGURE 12 Deciduous, spruce-fir, and alpine

FIGURES 8-12 Distribution patterns for representative species of bryophytes on Whiteface and Ampersand Mts.

posed nonalpine areas as well. It is noteworthy that four out of five of these species belong to one family, the Polytrichaceae. The fifth, *Grimmia donniana* is restricted to this zone, but *Grimmia apocarpa* is also found here. This species and *Andreaea rupestris* are found both in the arctic-alpine zone and at lower elevations where suitable rock substrates occur. The Polytrichaceae and Grimmiaceae (including *Racomitrium heterostichum*, also found at high elevations on Whiteface), as well as *Andreaea*, show a variety of adaptations to high winds, drying, and other aspects of exposure. These include lamellae, hair points, and a clumped or turfed growth form. Other bryophytes found only in the arctic-alpine quadrats, but in more moist habitats, were, *Sphagnum russowii*, *Calliergon stramineum*, *Anastrophyllum michauxii*, and *Gymnocolea inflata*.

Many lichens, particularly crustose lichens, also show the same pattern of distribution. Lichens were noted but not included in the present study. At lower elevations, they form a very minor component of the plant communities except as epiphytes. Above timberline in the arctic-alpine summit area, however, they become a major component, both as fruticose forms, largely *Cetraria* and *Cladonia* species, on the ground, and crustose species on rocks. In one summit quadrat, I distinguished fifteen species of lichens, giving a higher species richness (S) than for either bryophytes or vascular plants. Further work on plant diversity in this zone should include lichens.



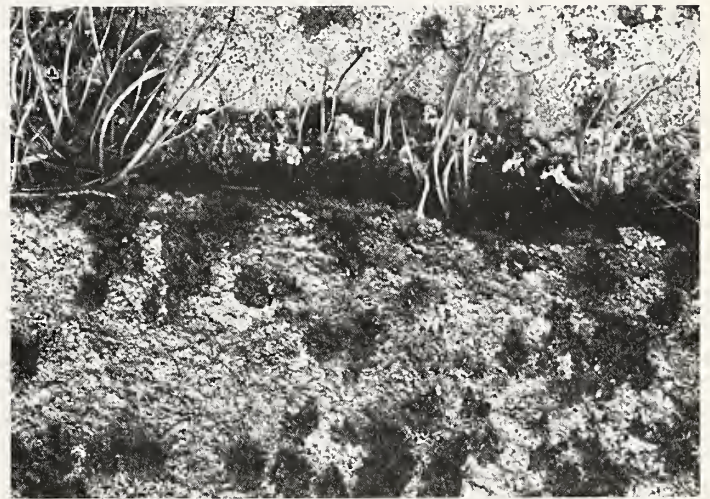
(photo by A. B. Wellborn)

Polytrichum piliferum, showing hair points, near summit, Whiteface Mountain.



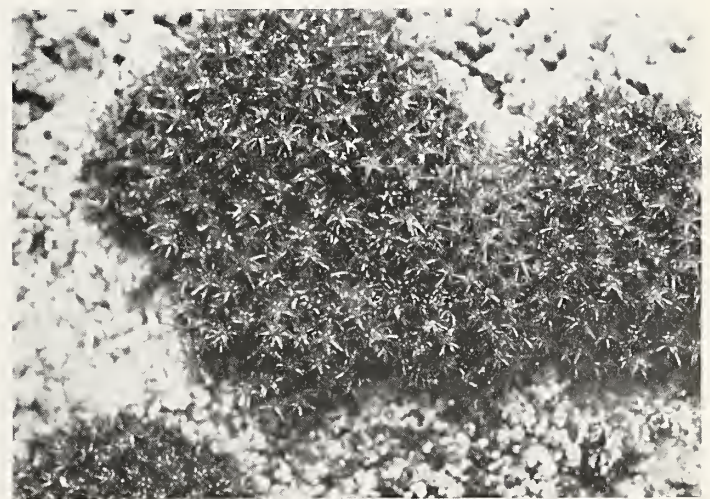
(photo by A. B. Wellborn)

Dicranum scoparium, a dominant moss of deciduous forests, also found in spruce-fir forests (see fig. 10).



(photo by A. B. Wellborn)

Andreaea rupestris, characteristic moss of arctic-alpine zone, also found on suitable rock outcrops at lower elevations.



(photo by A. B. Wellborn)

Andreaea rupestris with crustose lichens on rock face near summit, Whiteface Mountain.

Species characteristics of the spruce-fir zone and also found in the arctic-alpine area are shown in figure 8. One of these, *Ptilidium ciliare*, reaches its highest cover value in the latter area where it grows among lichens, particularly *Cetraria islandica*. (It is found at altitudes of at least 4500 ft in the krummholz, associated with *Polytrichum juniperinum*.) Some of the predominantly spruce-fir species are shown in figure 9; two of these, *Ptilium crista-castrensis* and *Drepanocladus uncinatus*, were found only in spruce-fir quadrats, though both were occasionally found at lower elevations. Two very characteristic species of this zone, *Bazzania trilobata* and *Brotherella recurvans* (fig. 9) were found also in deciduous forest quadrats.

Several other species were restricted to the spruce-fir zone, but found only in small quantities. One of these, *Isopterygium distichaceum* (formerly *I. subfalcatum*), is of particular interest because it does not appear in the New York State checklist (Ketchledge, 1957) for the Adirondacks, and there was only one report for the whole State at that time. Six collections were made in this study, at 2400 ft (730 m) and 2800 ft (850 m) on Ampersand and at 4000 ft (1220 m) on Whiteface, all within the spruce-fir zone.

Representative species present in both deciduous forest and the spruce-fir zone, the most common distribution for bryophytes in the study, are shown in figures 10 and 11. Of these, probably only *Plagiothecium laetum* is more characteristic of spruce-fir than of deciduous forest. Two other species of *Hypnum*, in addition to *H. pallescens* (including *H. reptile* Michx of the New York checklist, fig. 11), *Hypnum lindbergii* and *H. imponens* were also found predominantly in the deciduous forest quadrats. Of the eight species of *Brachythecium* found, six, including *B. salebrosum* (fig. 11) had distributions largely in deciduous forest. Two species, *B. curtum* and *B. reflexum*, grow in both deciduous and spruce-fir forest.

A few species occur throughout the elevation range wherever conditions are suitable. These include species growing on rock, such as *Grimmia apocarpa* and *Andreaea rupestris*, as noted above, and those growing on wood such as *Dicranum montanum* and *Ptilidium pulcherrimum* (fig. 12.). Weedy species such as *Dicranella heteromalla* and *Pohlia nutans* occur over the whole elevation range, but are uncommon in mature forest quadrats, although common along the trails and in other open, disturbed areas even above timberline.

It is clear that differing distributions of the bryophyte species over the elevation range used in this study add to the overall bryophyte diversity. Both species presence and relative density (cover) change with elevation for the great majority of species. Differing physiological tolerances and competition among species are probably both involved; only an experi-



(photo by A. B. Wellborn)

Polytrichum juniperinum and *Ptilidium ciliare* bryophyte mat, characteristic of krummholz zone, Whiteface Mountain.

mental approach could distinguish these two causes of change in species along the elevation gradient. Tolerance and competitive ability are, of course, related. Species only moderately tolerant of arctic-alpine environmental conditions are unlikely to be good competitors in that zone. Competition, both among bryophyte species and between bryophytes and vascular plants, is discussed in a later section.

The Relation Between Total Bryophyte Cover and Diversity

In figure 13, the actual percent cover of Adirondack bryophytes is shown graphically with diversity (H') of bryophytes at each elevation. The cover value is the percent of each quadrat covered by all bryophytes. It varies in the Adirondack quadrats from 0.6 to 44.3 percent. It can be seen that the cover value, which indicates the relative importance (incorporating both density and basal area) of bryophytes in the whole plant community, increases rapidly where the spruce-fir zone is reached. This occurs at a lower elevation on Ampersand than on Whiteface, as noted above. Diversity, on the other hand, did not change greatly with elevation, at least below 4000 ft (1220 m). The arctic-alpine quadrats also have high cover values, often 20 percent or higher except in unstable rockslide areas, but with relatively low diversity compared to lower elevations. Diversity is highest at 1600 ft (490 m) on Ampersand, where cover values reach a maximum of only 2.2 percent! Thus the total cover of bryophytes is not correlated in the Adirondack quadrats with diversity, nor is any such correlation found when species richness (S) is used instead of Shannon diversity index.

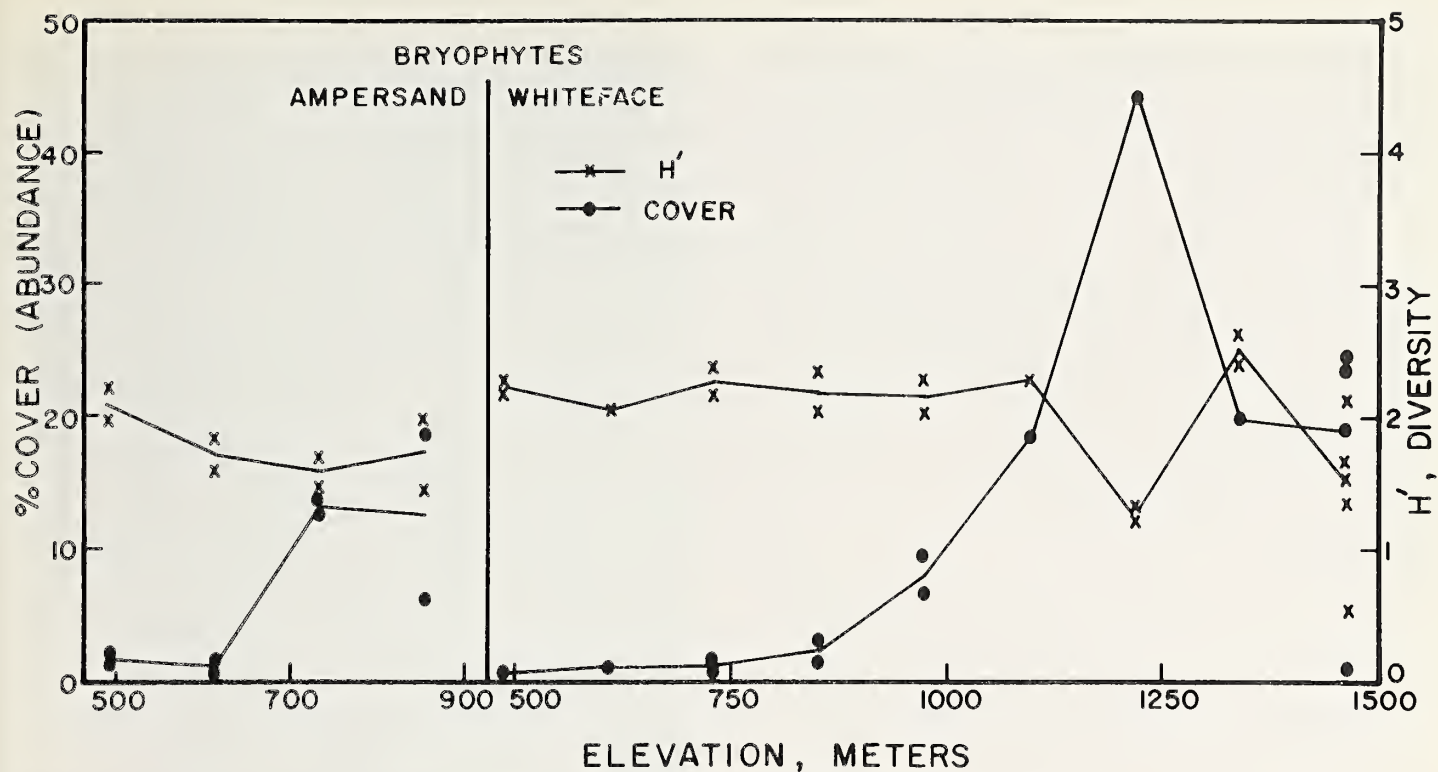


FIGURE 13 Percent cover bryophytes and diversity (H') at each elevation at Ampersand and Whiteface Mts.

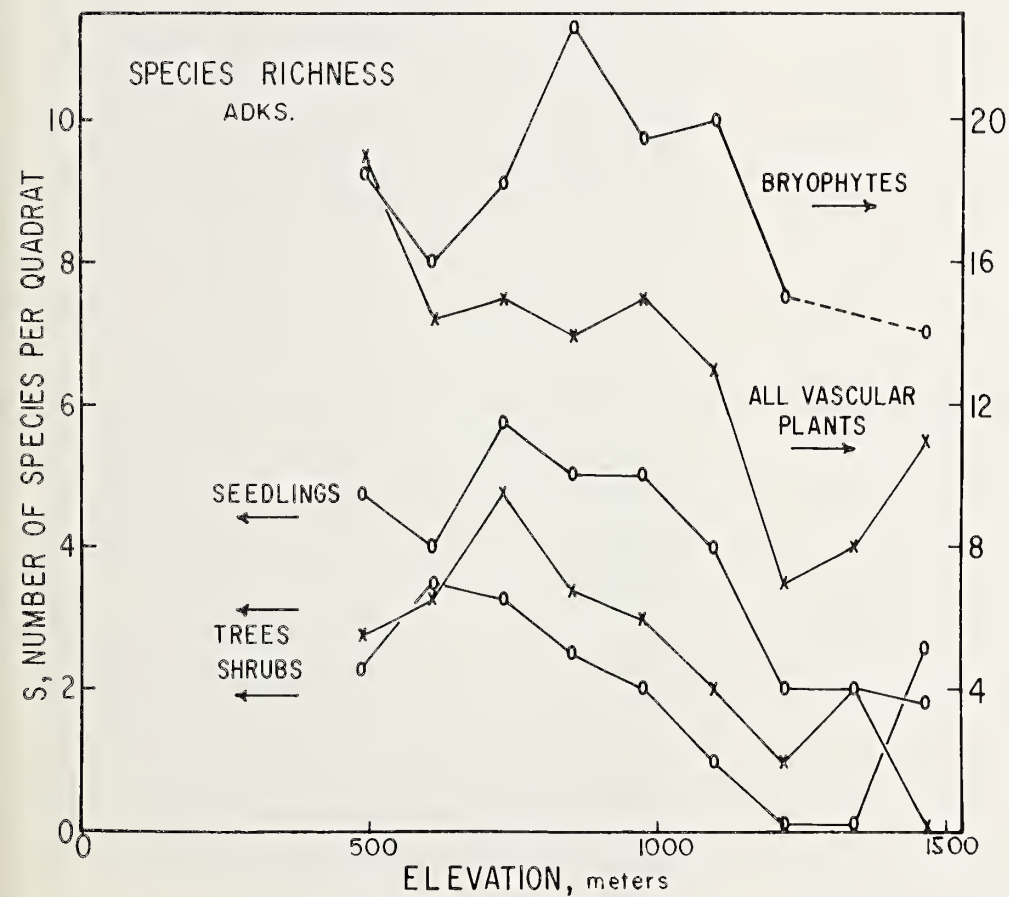


FIGURE 14 Changes in species richness (S) with elevation for: bryophytes, all vascular plants, tree seedlings, trees, and shrubs at Whiteface and Ampersand Mts.

Within any one vegetation zone, however, diversity (H') and cover may be correlated. In the deciduous forest on Ampersand, diversity and cover values are as follows for the four quadrats:

| | | | | |
|----------|------|------|------|------|
| % cover: | 0.55 | 0.98 | 1.5 | 1.8 |
| H' : | 1.59 | 1.83 | 1.96 | 2.21 |

On Whiteface, however, the diversity values are all quite similar for the deciduous quadrats (2.0 to 2.38 for six quadrats) and there is no such direct relationship. The Kenrose Preserve data (see separate section below) do show positive correlation ($r = -0.63$) of total bryophyte cover and bryophyte diversity in the deciduous forest.

Bryophytes in Relation to Other Plant Strata

Figure 14 shows changes in species richness (S) with elevation on Whiteface and Ampersand for trees, shrubs, seedlings, and bryophytes. For clarity, ground flora is not shown separately here but is included in "all vascular plants." (It is shown separately in figure 15.) It can be seen that bryophytes show higher species richness than all vascular plants together except at 1600 ft (490 m) where they are about equal in numbers of species. Both trees and tree seedlings peak at about 2400 ft (730 m), where a variety of deciduous trees and seedlings occur together with a small admixture from the spruce-fir forest. The total number of vascular plant species, however, decreases with elevation, although there is a sharp increase at the summit. This increase results from a large number of shrub species such as *Vaccinium uliginosum* and *Ledum groenlandicum*, which only occur in the arctic-alpine zone in this study.

The number of species of bryophytes present within quadrats of one vegetation zone varied considerably. Within the larger forest types, such as spruce-fir, much variation exists. One can subdivide this type into a number of subtypes, based on relative dominance of red spruce and balsam fir. The presence of the latter depends on ground moisture as well as on elevation. Balsam fir becomes dominant at the higher elevations, but, even within pure balsam fir stands, the trees differ in age and density. Such structural differences within one forest type should be studied further in relation to bryophyte diversity. In some stands of fir, the presence of dead lower branches resulted in more light and lower humidity and a bryophyte layer on the forest floor quite different from that in other stands. At 4400 ft (1340 m) on Whiteface, where there is dense fir forest and very late snow cover, species richness of bryophytes and especially of liverworts, rises very sharply (see fig. 3). The high humidity in *Abies* stands, so dense that one can hardly stand up in these quadrats, is increased by the late snow melt, and



photo by N. G. Slack

Less mature deciduous forest with much *Betula papyrifera*, Whiteface Mountain; high bryophyte diversity was found here.

creates conditions favorable to many liverworts.

The deciduous forest stands also vary in species composition, in part a result of differences in maturity. The maximum number of bryophyte species was almost as high (25) in deciduous forest quadrats as in spruce fir (30) or in pure fir (28), in spite of the much greater cover of bryophytes under spruce and fir. Within the deciduous forest zone, a slightly higher maximum number of species occurred in the less mature deciduous forest with much *Betula papyrifera* (25) than in the mature sugar maple-beech forest (23). In each of the above forest types, the species composition differed. Thus the within-habitat (alpha) diversities for the different forest types add up to a high between-habitat (beta) diversity over the whole elevation range. This finding further corroborates the original hypothesis regarding species diversity and elevation range.

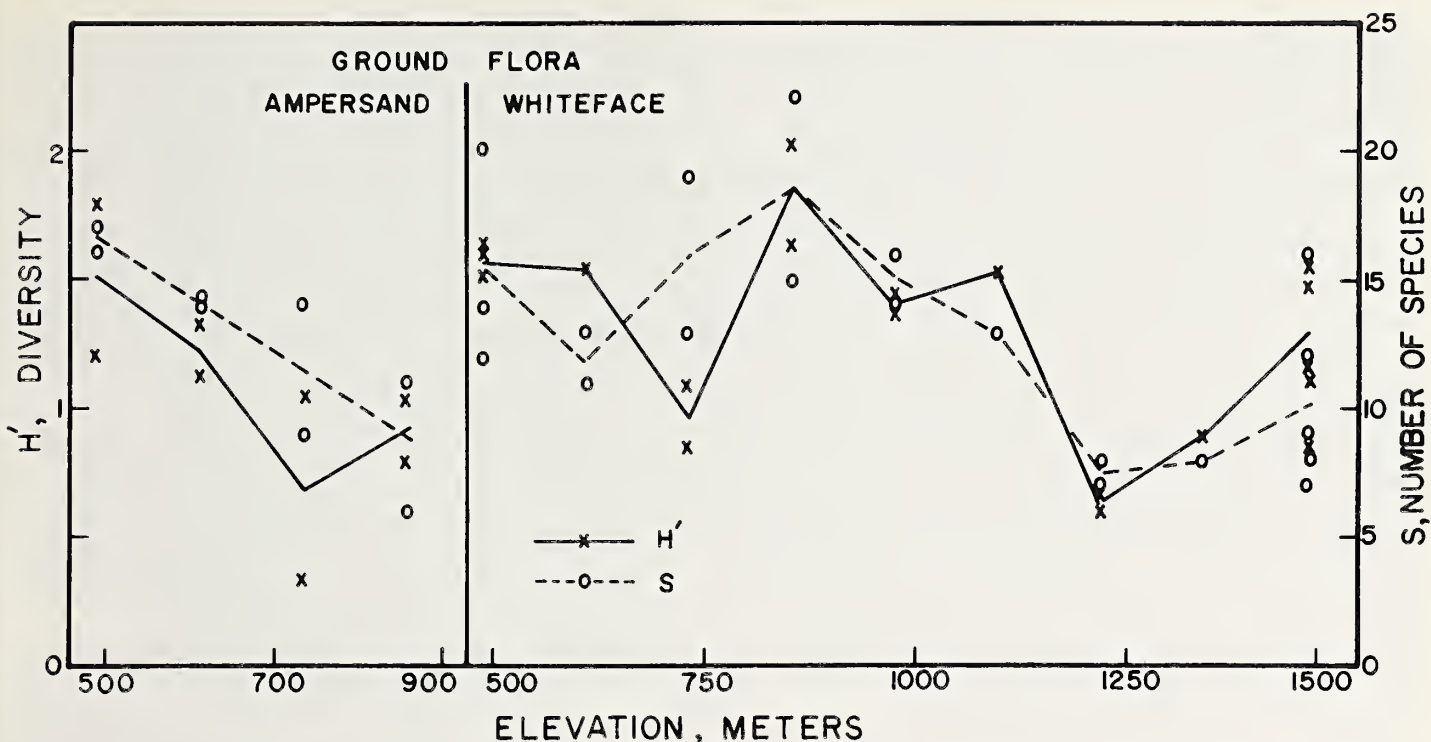
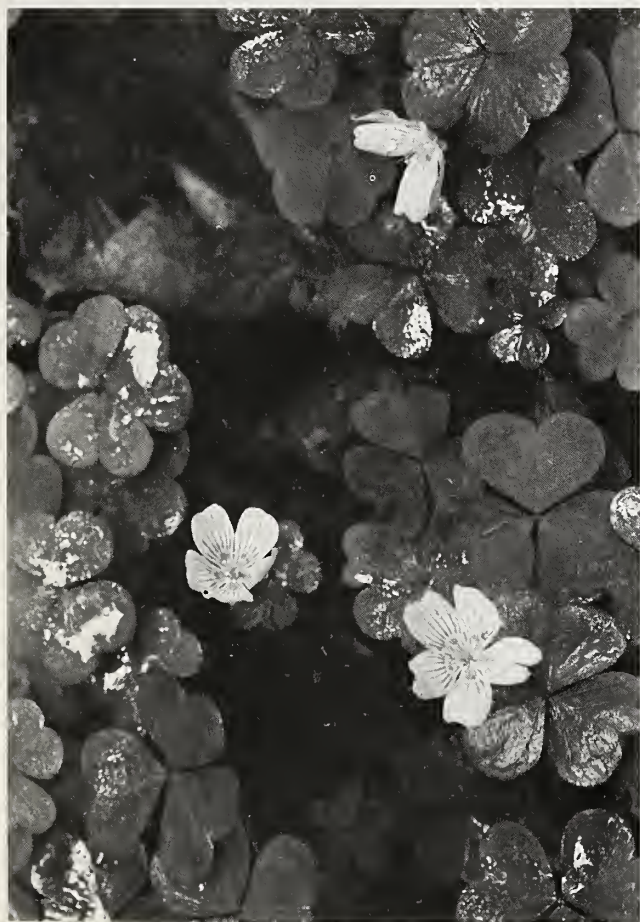


FIGURE 15 Changes in species richness (S) and diversity (H') for ground flora with changes in elevation at Ampersand and Whiteface Mts.



(photo by A. B. Wellborn)

Oxalis montana, dominant herbaceous vascular plant in spruce-fir zone on Whiteface and Ampersand Mountains.

Vascular ground flora was studied quantitatively in each of the quadrats (see field methods). When species richness (S) and diversity (H') are plotted for the ground flora in relation to elevation (fig. 15), no clear relationship is seen over the whole range of elevations on Whiteface. On Ampersand, with a more limited elevation range, both S and H' are seen to decrease with elevation; they are higher in the deciduous than in the spruce-fir forest. On Whiteface, high and low diversities were found in both forest types; factors other than elevation appear to be important in determining the number of species in the ground flora and their relative abundances. At 4000 ft (1220 m) a dominant herbaceous vascular plant, *Oxalis montana*, accounts for 82 to 85 percent of the ground flora density in these quadrats, and accounts for the low evenness values ($J' = 0.40, 0.36$). In these same quadrats, one bryophyte, *Pleurozium schreberi*, similarly accounts for a low J' and consequently low H' value for bryophytes as explained above.

As has already been seen for bryophytes, the species composition of the ground flora changes with elevation; also, the range of elevations adds to the diversity of the ground flora for the whole mountain. For example, at 4800 ft (1490 m), in the arctic-alpine quadrats, many plants appear that do not occur at lower elevations, even at 4400 ft (1340 m). These include *Agrostis borealis*, *Arenaria groenlandica*, *Carex bigelowii*, *C. brunnescens*, *Juncus trifida*, *Lycopodium selago*, *Potentilla tridentata*, *Scirpus caespitosus*, and *Solidago cutleri*. Thus, Sørensen and Percent Similarity values



(photo by N. G. Slack)

Lower layers in *Abies balsamea* forest, Whiteface Mountain, showing *Oxalis montana* and young balsam reproduction.

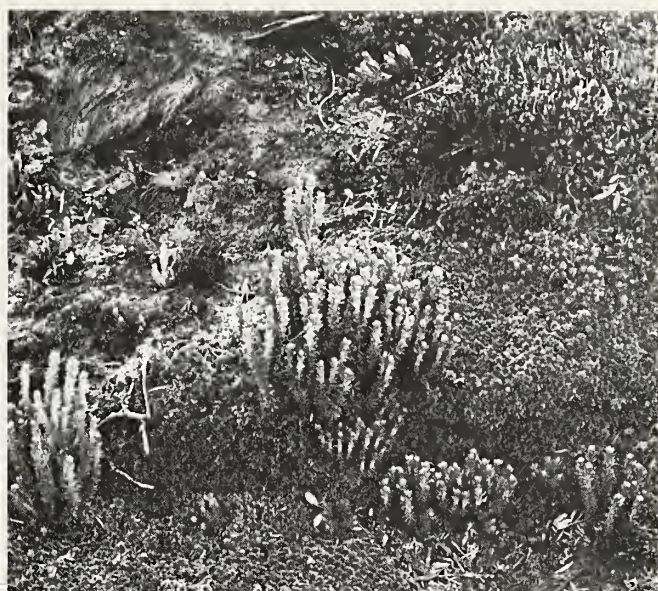


(photo by N. G. Slack)

Ground flora of transition zone, Whiteface Mountain, including *Cornus canadensis*, *Lycopodium lucidulum*, *Monotropa uniflora*, *Oxalis montana*, and the moss, *Dicranum scoparium*.



(photo by A. B. Wellborn)



(photo by A. B. Wellborn)



(photo by N. G. Slack)



(photo by A. B. Wellborn)

TOP LEFT:

Ground flora of deciduous forests, including *Medeola virginiana*, *Dryopteris spinulosa*, *Acer saccharum* and *A. pensylvanicum* seedlings.

TOP RIGHT:

Bryophyte community and *Lycopodium selago*, arctic-alpine zone, Whiteface Mountain.

ABOVE:

Ground flora of *Abies balsamea* forest including *Oxalis montana*, and mosses *Hylocomium splendens* and *Pleurozium schreberi*.

RIGHT:

Lycopodium selago with *Ledum groenlandicum* and *Cetraria islandica*, arctic-alpine zone, Whiteface Mountain.

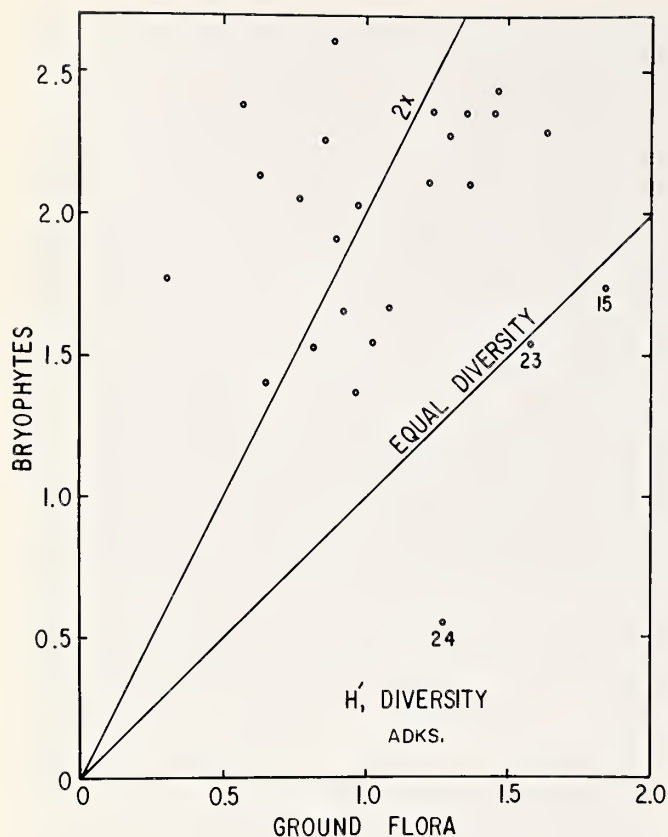


FIGURE 16 Bryophyte diversity (H') versus ground flora diversity (H') at Ampersand and Whiteface Mts.

between quadrats at 4400 ft and 4800 ft are very low (0.00 to 0.14). Similarly, some species occur in the deciduous forest quadrats but not at higher elevations. Thus, the ground flora showed patterns over the elevation gradient similar to those shown for bryophytes in figures 5 and 6 and 7 through 12.

The diversity (H') of the ground flora and that of shrubs is compared with that of bryophytes in figures 16 and 17. The shrub category included shrubby understory trees such as *Salix*. The large quadrat size (40 m²) makes comparison of these strata possible, but it is probably too small for reliable comparison with canopy trees. With the notable exception of quadrat 24, diversity (H') is approximately equal or higher for bryophytes than for the ground flora of shrubs. For almost all quadrats, it is considerably higher (see figs. 16 and 17). Even in arctic-alpine quadrat 24, the number of species of bryophytes (9) is higher than the number of species on the ground flora (5) or of shrubs (2), but the evenness component (J') is only 0.25, the lowest for bryophytes in the entire study. *Polytrichum strictum* accounts for more than 80 percent of the bryophyte cover in this quadrat.

I have compared the Adirondack data with those for other mountain areas such as the Great Smokies and the Rocky Mountains (Whittaker, 1956, 1967; Bliss,

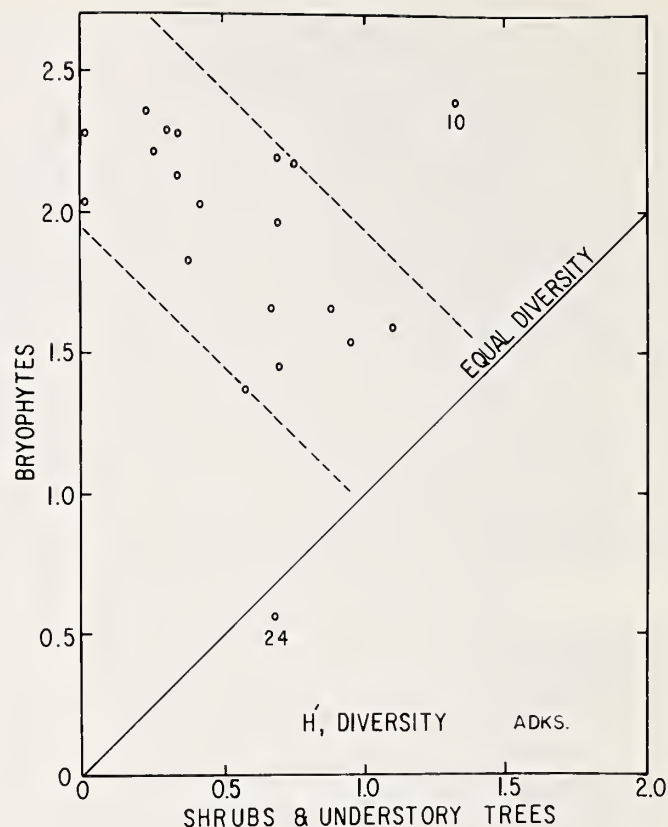


FIGURE 17 Bryophyte diversity (H') versus shrub diversity (H') for Ampersand and Whiteface Mts.

1963). The number of vascular plant species is lower in the Adirondacks than in the other areas, so that this high ratio of bryophytes to ground flora may not be a general one. It may, however, be characteristic of spruce-fir forest, in which low light levels and high humidity favor bryophytes over herbaceous vascular plants; more data are needed to resolve this question. In the Southern Blue Ridge of North Carolina, where I have also been working, species richness of both vascular plants and bryophytes is higher than in the Adirondacks, at least in deciduous forest. Within-habitat diversity of bryophytes and vascular plants has not yet been studied there, in a comparable way; therefore, further comparisons are not yet possible.

No particular effect of ground flora diversity on that of bryophytes can be seen in figure 16. Interactions are present, however. Apparent competition between an herbaceous vascular plant, *Oxalis montana*, and a bryophyte, *Pleurozium schreberi*, was noted in the quadrats at 4000 ft (1220 m); where *Oxalis* density was very high, the moss was absent or appeared dead. *Oxalis* seedlings had germinated in the *Pleurozium* carpet, however, and where the *Oxalis* was less dense, both occurred together. The moss can photosynthesize both early in the season before the *Oxalis* leaves expand and in early fall after they have been killed by

frost, to allow some seasonal variation in resource use. Here, the question of competition could be studied by removal of *Oxalis* and/or moss completely or to various density levels in different plots. Very little is known, however, about growth rates of bryophytes in nature. A one dm² plot of *Pleurozium* adjacent to quadrat 19 at 4000 ft (1220 m), which I removed, showed no sign of regrowth after more than a year, although surrounded by undisturbed *Pleurozium schreberi*.

Figure 17 does show an inverse relationship between bryophyte diversity (H') and shrub and understory tree diversity ($r = -0.31$). This may be the result of competition; with more shrub species there may be less light, less water, or less space available for bryophytes. Quadrat 10 (fig. 17), in which both shrub and bryophyte diversity are high, has many young understory trees. It is in a relatively immature open deciduous forest, with many species of bryophyte growing in exposed places on both soil and rock. It seems unlikely that bryophyte diversity can affect that of shrubs and understory trees, but that the reverse is true is only suggested, not proven, by a significant negative correlation.

Is Seasonal Diversity a Factor?

Seasonal diversity is of interest largely in respect to the ground flora stratum of the plant communities studied. There is virtually no seasonal diversity of bryophytes in these Adirondack forests, since bryophytic ephemerals do not occur in these habitats. Nor is there appreciable seasonal diversity on woody plant strata, although some tree seedlings do not appear until summer and many die out in the winter. Seasonal diversity is, however, a noticeable aspect of the herbaceous ground flora. Bulbous or rhizomatous perennials tend to show high productivity early in the season and to die back later, often using light resources available in early spring, but less available under an expanded leaf canopy. This phenomenon increases the total annual diversity of deciduous forests. Several deciduous forests quadrats on Ampersand and Whiteface were surveyed in late summer and again in May to determine the extent of seasonal diversity. Six species were found in the spring survey that had not been found in the same quadrats previously, notably *Erythronium americana*, *Smilacina racemosa*, and *Trillium undulatum*, all spring-flowering perennial herbs with food storage organs. The quadrat in which most additional species were found, quadrat 3 on Whiteface at 1600 ft (370 m), is compared below for late summer (3) and the following spring (3'):



(photo by N. C. Slack)

Oxalis montana and *Pleurozium schreberi*, probable competing species on forest floor under *Abies balsamea*.

| Quadrat | S | H' |
|---------|----|-----|
| 3 | 14 | 1.6 |
| 3' | 20 | 1.4 |

There is an increase in species richness from 14 to 20, but very little change in diversity (H'). The Shannon function continues to increase indefinitely as new species are added, but at a diminishing rate. Thus, if one species with a relative abundance of 5 percent were replaced by five equally abundant species, the increase in H' would be only 0.08. If the additional species are not equally abundant, the function may even decrease, as in the present case. The Shannon function may thus undervalue seasonal diversity, but in this forest ecosystem neither the species richness nor the productivity of spring ephemerals is very great compared to that of the plant community as a whole. A much greater contribution in both respects is made by ephemeral vascular plants in other ecosystems, for example, desert summer ephemeral (Whittaker, 1965).



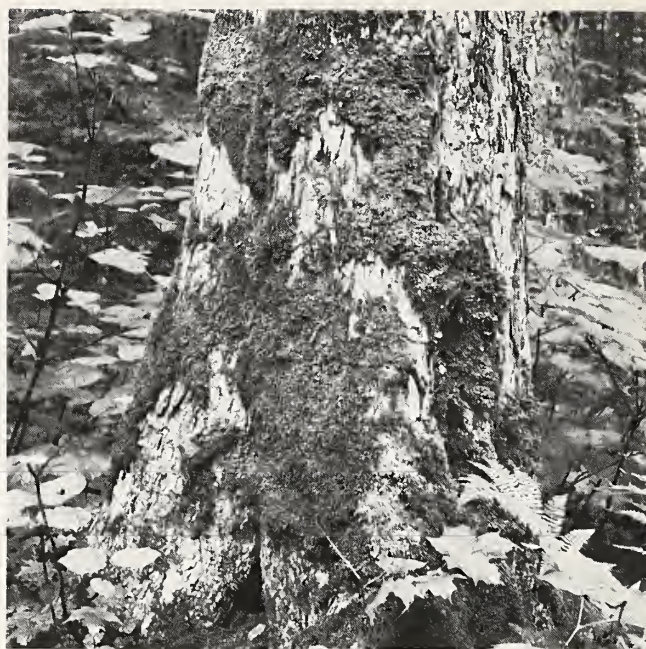
(photo by A. B. Wellborn)

Hemlock-hardwood forest on Ampersand Mountain, containing sugar maple, yellow birch, American beech and hemlock.

Study of Epiphytic Bryophytes (Ampersand)

One possible objection to the Adirondack study is that all bryophyte habitats have not been adequately sampled. None of the quadrats was chosen for its "good" bryophyte habitats; the only predetermined factor in the choice of locations was altitude. Since the main object of this study was to measure diversity, areas in which bryophytes were known to be particularly diverse could not be purposely chosen. Nevertheless, certain "good" bryophyte habitats, such as streambanks and wet rock ledges, have been under-sampled by these methods. Many species of bryophytes of specialized microhabitats, found elsewhere in the Adirondacks, have not appeared in any of the quadrats. Detailed studies of communities in such habitats would complement the present study. A valuable quantitative study of one such community, that of rotten logs, has recently been completed by Mühle and LeBlanc (1975). In addition to the quadrat studies, I have made a pilot study of epiphytic bryophyte communities, to determine whether this specialized habitat adds significantly to bryophyte diversity in the Adirondack forest.

Epiphytes on northern hardwood trees are characteristic of undisturbed Adirondack areas with high rainfall. Such epiphytes occur on both Whiteface and Ampersand Mountains, but are relatively uncommon except at the lower elevations on Ampersand (1600 to 2000 ft). True epiphytes on tree trunks were not included in the quadrat studies; tree base communities



(photo by A. B. Wellborn)

Epiphytes of *Acer saccharum* on Ampersand Mountain, including *Neckera pennata* and *Porella platyphylloidea*.

were measured up to three decimeters from ground level, but these are quite different from true epiphyte communities further up the trunk.

Epiphytic bryophytes are present largely on four species of trees on Ampersand: *Acer saccharum*, *Betula alleghaniensis*, *Fagus grandifolia*, and *Tsuga canadensis* (sugar maple, yellow birch, beech, and hemlock). Ten trees of each species were sampled, the only criterion being the presence of epiphytes up to at least two meters. In many cases they were present to 10 m.

I attempted to record all species present, by using a ladder and long pole to reach the upper trunks. As in all parts of this study, specimens which could not be identified with certainty in the field (e.g., species of *Frullania* and *Brachythecium*) were brought back to the laboratory for further study. Diameter at breast height (dbh) was measured for all trees studied. Each tree was treated as a "quadrat" in the analyses of species composition. The results, which follow, have proven interesting even with this limited amount of data.

Nine species of bryophytes were found growing as epiphytes and not found elsewhere in the quadrats on either Ampersand or Whiteface, indicating that this habitat is indeed an additional source of diversity. Furthermore, three other epiphytic species had been found only once before, on a tree base on Ampersand at 1600 ft (490 m). Although tree base communities contain a mixture of true epiphytes and others that are primarily terrestrial, these three species did not occur elsewhere on the ground. Thus I found a total of twelve species growing only as epiphytes.

Different species of trees offer different microhabitats for bryophytes in terms of bark porosity, roughness, exfoliation, chemistry, pH, etc. (Billings and Drew, 1938; Barkman, 1958; Slack, 1976). The effects of such differences among the four species of host trees or phorophytes were examined in terms of species richness (S) of the bryophytes growing on them. The results are as follows:

| | Species richness (S) | Max. no. species/tree |
|------------------------------|----------------------|-----------------------|
| <i>Betula alleghaniensis</i> | 23 | 11 |
| <i>Fagus grandifolia</i> | 20 | 10 |
| <i>Tsuga canadensis</i> | 7 | 5 |
| <i>Acer saccharum</i> | 23 | 13 |

I found a total of 36 species of epiphytic bryophytes, 26 mosses, and 10 liverworts. Many additional species occurred in humus on the tree bases, but these are not true epiphytes and were not included. For comparison, Brown (1948), in a study of epiphytes throughout New York State, found 35 mosses and 19 liverworts growing as epiphytes as defined above. (She found eight additional mosses and six additional liverworts on stumps or tree bases.) Brown's study included 25 stations at elevations from sea level to 5000 ft (1525 m). Seventy-four percent of the moss epiphytes and 53 percent of the liverworts found by Brown, on 63 tree species and over an elevation gradient of 5000 ft throughout the State, were present on only four tree species over an elevation gradient of 5000 ft throughout the State, were present on only four tree species over an elevation gradient of only 400 feet on Ampersand Mountain. Comparisons of my data with those of Brown (1948) and of Phillips (1951) in Michigan are shown in table 5. The bryophytic epiphytes found in the Ampersand study are shown in table 6. Phillips found 38 species of epiphytic bryophytes on 25 different host trees over all of Michigan, including 22 species on the four trees used in the present study. Brown found 38 species on these same four trees, only two more than on Ampersand, although Brown observed trees at more than twenty different sites in the State.

A great many studies have been made of epiphytic bryophytes in North American temperate forests in addition to those of Brown and Phillips. Examples include those of Beals (1965), Billings and Drew (1938), Cain and Sharp (1938), Coleman, Muenscher, and Charles (1956), Culberson (1955), Hale (1955), Hoffman (1971), LeBlanc (1961), and Quarterman (1949). Barkman, who has made extensive studies in Europe, has reviewed the American as well as the European epiphyte literature (1958). I have reviewed much of the subsequent epiphyte literature (Slack, 1976). Many of the earlier studies are concerned with

the classification of epiphyte communities by phytosociological methods. Hoffman studied diversity of epiphytes but on only one host tree, Douglas fir. Beals, Culberson, and Hale considered diversity of epiphytes on a variety of trees in Wisconsin, but, although both tree and epiphyte species overlap with those on Ampersand, the overlap is insufficient to justify extensive comparisons with my data. The number of species and the cover of bryophytes may vary with the age of the tree for any one species, as Quarterman, (1949) showed for red cedar. However, diameter at breast height is a reasonably good indicator of relative age for any one species of tree within a single locality and was used in this study. The relationship between tree size and the number of bryophyte species it supports varies with the species of tree. A linear relationship was not found for any of the four species, but such a relationship was suggested for beech (shown in comparison with sugar maple in figure 18) and might be significant with a larger sample and larger maximum size of trees. I have seen larger beeches and larger yellow birches elsewhere in the Adirondacks, each of which supported a larger number of epiphyte species than the Ampersand trees.



Acer saccharum, showing large population of epiphytic moss, *Neckera pennata* on lower trunk.

(photo by N. G. Slack)

TABLE 5

Epiphytes Compared for Ampersand (present study),
New York State (Brown, 1949), and Michigan (Phillips, 1955)

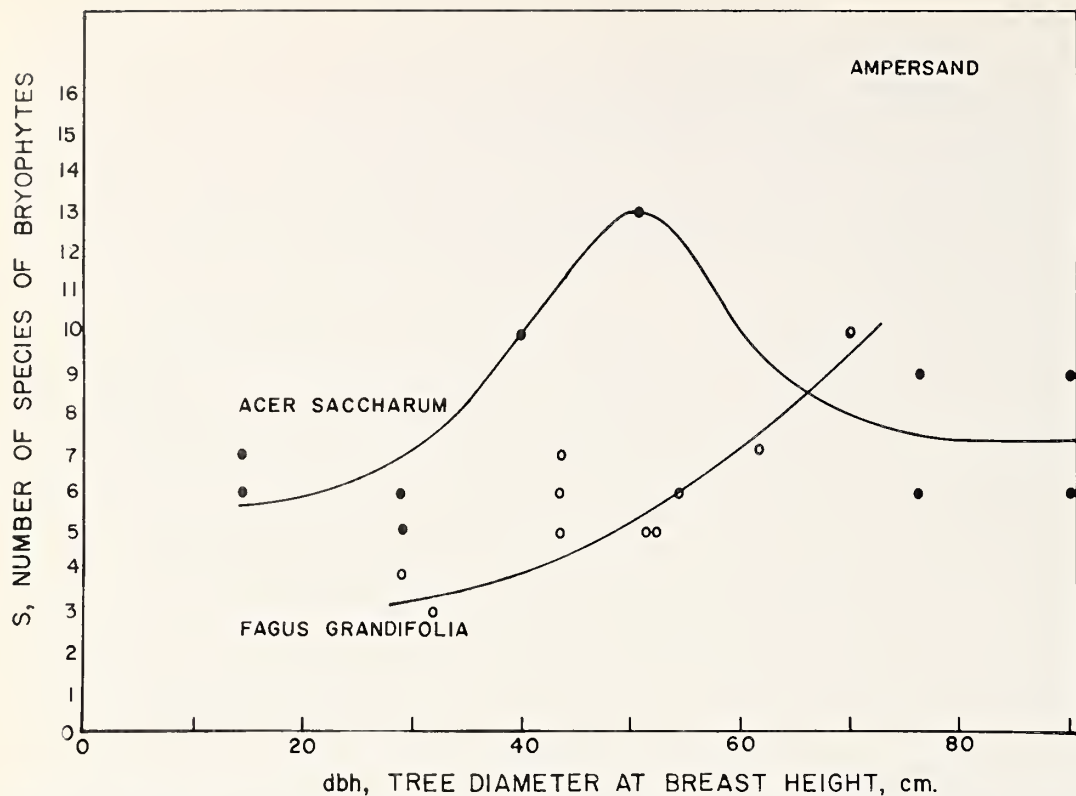
| | Acer.sac. | | | Fagus grand. | | | Betula alleg. | | | Tsuga can. | | |
|--------------------------------|-----------|----|------|--------------|----|------|---------------|----|------|------------|----|------|
| | Mich. | NY | Amp. | Mich. | NY | Amp. | Mich. | NY | Amp. | Mich. | NY | Amp. |
| Mosses | | | | | | | | | | | | |
| Amblystegium serpens | | | X | | | | | | X | | | |
| Anomodon attenuatus | X | X | X | | X | X | | | X | | | X |
| A. minor | X | | | X | | | | | | | | |
| A. rostratus | | | X | | X | | | | | | | X |
| A. rugellii | | | X | X | X | | | | | | | |
| Brachythecium oxycladon | | | X | X | X | | | | X | | | X |
| B. salebrosum | | | X | | X | | | | | X | | |
| B. starkei | | | X | | X | | | | X | | | |
| Brotherella recurvans | | | | | | X | | | X | X | | X |
| Dicranum flagellare | | | X | | X | | | | X | | | X |
| D. fuscescens | | | X | | X | | | | X | | | |
| D. montanum | X | | | X | X | | X | X | X | | X | X |
| D. viride | X | X | | X | X | | X | X | X | | X | X |
| Drepanocladus uncinatus | X | | | | | | | | X | | | |
| Haplohymenium triste | X | | | | | | | | | | | |
| Heterophyllum haldanianum | | | X | | X | | | | X | X | | |
| Herzogiella striatella | | | X | | X | | | | X | | | |
| Homomallium adnatum | X | | | X | | | X | | | | X | |
| Hylocomium splendens | | | X | | | | | | | | | X |
| Hypnum pallescens (H. reptile) | | | X | | X | X | X | | X | | X | X |
| H. cupressiforme | | | | | | | | | X | | | |
| H. imponens | | | X | | X | | | | X | | X | |
| Leskeella nervosa | X | | | | | | | | | | | |
| Leucodon sciurioides | X | | X | X | | X | X | | | | X | |
| Mnium affine | | | X | | | X | | | | X | | |
| Mnium punctatum | | | X | | | X | | | | | | |
| Neckera pennata | X | X | X | X | | X | X | X | | | X | |
| Orthotrichum elegans | X | | | | | | | X | | | | |
| O. obtusifolium | X | | | X | | | | X | | | X | |
| O. pumilum | X | | | X | | | | | | | | |
| O. sordidum | X | | | X | | | X | | | | X | |
| O. strangulatum | | | | | | | | | X | | | |
| Paraleucobryum longifolium | | | | | X | | | | X | X | | |
| Plagiothecium denticulatum | | | X | | X | | | | X | | | X |
| P. laetum | | | X | | | X | | | | X | | |
| Platygyrium repens | | | X | X | | X | | X | X | | | X |
| Pylaisiella intricata | | | X | X | | X | | | | | | |
| P. selwynii | X | X | X | X | | | X | | | | X | X |
| Rauvella scita | | | X | | | | | | | | | |
| Thuidium delicatulum | | | | X | | X | | | X | X | | X |
| T. recognitum | | | | | | | | | | | | |
| Ulota crispa | X | X | X | X | X | X | X | X | X | | X | |
| U. ludwigii | | | | X | | | | | | | | |
| Liverworts | | | | | | | | | | | | |
| Bazzania trilobata | | | | | | | | | X | X | | X |
| Cololejeunea biddlecomiae | | | X | | | | | | X | | | |
| Frullania asagrayana | | | | X | | X | | | X | X | | X |
| F. bolanderi | X | | | X | | | X | | | | X | |
| F. eboracensis | X | X | X | X | X | X | X | X | X | | X | X |
| F. inflata | | | | | | X | | | | X | | |
| Jamesoniella autumnalis | | | | | X | X | | | X | X | | |
| Lophocolea heterophylla | | | X | | X | | | | X | X | | X |
| Lophozia ventricosa | | | | | | | | | X | | | |
| Plagiochila asplenioides | | | | X | | | | | | | | |
| Porella platyphylloidea | X | X | X | X | X | X | X | X | | | X | X |
| Ptilidium pulcherrimum | X | X | | | X | X | X | X | X | | X | X |
| Radula complanata | X | X | X | X | X | X | X | X | | | X | X |

TABLE 6
Bryophytic Epiphytes, Ampersand Mountain

| | <i>Acer.sac.</i> | <i>Fagus grand.</i> | <i>Betula alleg.</i> | <i>Tsuga can.</i> |
|-----------------------------------|------------------|---------------------|----------------------|-------------------|
| Mosses | | | | |
| <i>Amblystegium serpens</i> | x | | | |
| <i>Anomodon attenuatus</i> | x | x | | |
| <i>A. rugellii</i> | x | | | |
| <i>Brachythecium oxycladon</i> | x | x | | |
| <i>B. salebrosum</i> | x | x | x | |
| <i>Brotherella recurvans</i> | | x | x | x |
| <i>Callicladium haldanianum</i> | | | x | |
| <i>Dicranum montanum</i> | | x | x | x |
| <i>D. viride</i> | | x | x | |
| <i>Homalia trichomanoides</i> | x | | | |
| <i>Hylocomium splendens</i> | x | | | |
| <i>Hypnum imponens</i> | | | x | |
| <i>H. pallescens</i> | | x | x | x |
| <i>Leucodon brachypus</i> | x | x | | |
| <i>Mnium ciliare</i> | x | x | x | |
| <i>M. punctatum</i> | | x | | |
| <i>Neckera pennata</i> | x | x | | |
| <i>Paraleucobryum longifolium</i> | | | x | |
| <i>Plagiothecium laetum</i> | x | x | x | |
| <i>Platygyrium repens</i> | x | x | x | |
| <i>Pylaisiella intricata</i> | x | x | | |
| <i>P. selwynii</i> | x | | | |
| <i>Rhodobryum roseum</i> | x | | | |
| <i>Rhytidiadelphus triquetris</i> | x | | | |
| <i>Thuidium delicatulum</i> | x | x | x | |
| <i>Ulota crispa</i> | x | x | x | |
| Liverworts | | | | |
| <i>Bazzania trilobata</i> | | | x | x |
| <i>Frullania asagrayana</i> | x | x | x | x |
| <i>F. eboracensis</i> | x | x | x | |
| <i>F. inflata</i> | | x | x | |
| <i>Jamesoniella autumnalis</i> | | x | x | |
| <i>Lophocolea heterophylla</i> | | | x | |
| <i>Plagiochila asplenoides</i> | x | | | |
| <i>Porella platyphylloidea</i> | x | x | | x |
| <i>Ptilidium pulcherrimum</i> | | x | x | x |
| <i>Radula complanata</i> | x | x | | |

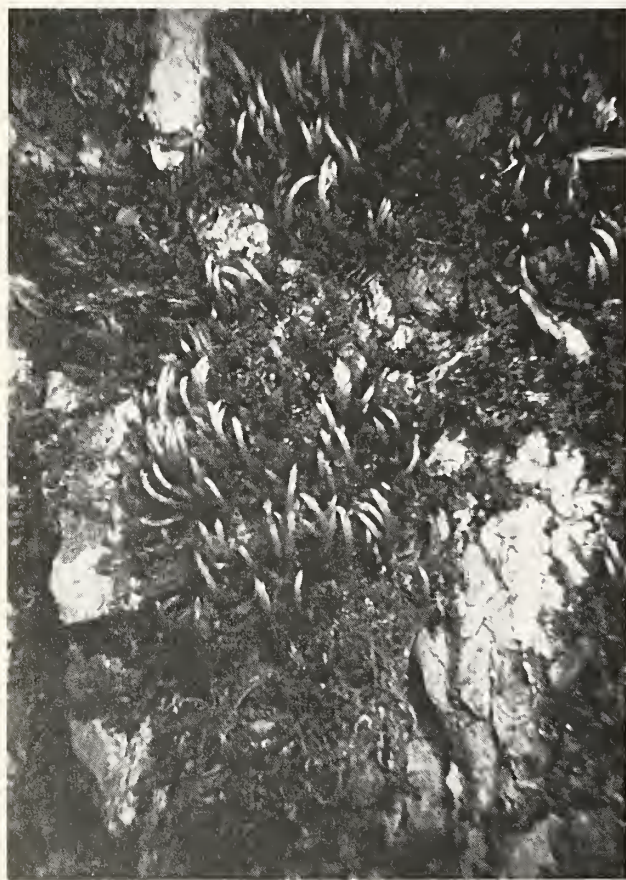
The fact that 23 different species grow on beech and 20 on yellow birch, even though no individual tree had more than 10 or 11 epiphyte species, respectively, indicates a higher potential diversity for larger, older trees. The bark on both of these trees roughens with age, increasing its water-holding capacity and the ease of attachment for bryophytes. Some bryophytes can

become established on smooth bark, *Frullania* species for example, but most cannot. Trees whose bark remains smooth, such as striped maple, *Acer pensylvanicum*, rarely support epiphytes in the Adirondacks. (In the southern Appalachians, under different climatic conditions which affect the bark, it does support epiphytes). Sugar maple, which has a rough bark even



(photo by D. M. Slack)

FIGURE 18 Relationship between tree diameter (dbh) and number of bryophytic epiphytes for *Acer saccharum* and *Fagus grandifolia* on Ampersand Mt.



(photo by N. G. Slack)

Epiphytic moss, *Leucodon brachypus*, v. *brachypus*, higher on trunk of *Acer saccharum*.



(photo by N. G. Slack)

Epiphytes on *Fagus grandifolia*, including *Hypnum pallescens* and *Frullania eboraensis*, as well as lichens.

as a young tree, was found to support a large number of epiphytic species even at small dbh.

A succession of species and changes in their relative abundance was found on sugar maple, with *Porella platyphylloidea*, *Neckera pennata*, and *Anomodon attenuata* dominant on different trees, but each of these species, as well as pioneer species such as *Radula complanata*, were found to persist at least in small quantities after their periods of dominance. The present data show an increase in species richness (S) of sugar maple epiphytes up to about 18 in (46 cm) dbh, followed by an increase in dominance and reduction in both S (fig. 18) and H' diversity, but larger numbers of trees and further cover measurements are needed to test this hypothesis. Age-size correlations are not completely reliable even for one locality; trees of one species may grow at different rates because of differences in microtopography, competition, or genetic factors. Increment boring to determine age is currently being used in further studies.

Host specificity of the epiphytic bryophytes on the four trees species was also considered. Using each tree as a separate "plot," I calculated Sørensen indices to compare all 10 trees of one species with respect to species composition of epiphytes. Means for the 45 resulting comparisons for each of the four species were as follows:

| | |
|------------------------------|------|
| <i>Acer saccharum</i> | 0.57 |
| <i>Betula alleghaniensis</i> | 0.58 |
| <i>Fagus grandifolia</i> | 0.48 |
| <i>Tsuga canadensis</i> | 0.42 |

These are high values, especially for sugar maple and yellow birch, showing similar composition of epiphyte communities on any one tree species. Sørensen values between each pair of host tree species were also calculated. Resulting means were as follows:

| | |
|---------------------|------|
| <i>Acer-Tsuga</i> | 0.02 |
| <i>Acer-Fagus</i> | 0.13 |
| <i>Acer-Betula</i> | 0.15 |
| <i>Fagus-Tsuga</i> | 0.27 |
| <i>Fagus-Betula</i> | 0.39 |
| <i>Betula-Tsuga</i> | 0.41 |

These values are all lower than those for single species, much lower except for *Fagus-Betula* and *Betula-Tsuga* comparisons, indicating that, while epiphytic bryophytes may not be closely host specific, within any one forest of particular age and climatic conditions, they show preference for particular tree species. Each of these trees presents somewhat different niche opportunities, probably because of differences in bark characteristics. It does appear, however, that bryophytes distinguish poorly between *Fagus* and *Betula* and between *Betula* and *Tsuga*. In the present study, 13 species were present on only one of the four

host trees, eight of these on sugar maple. In addition, four epiphytic species, very characteristic of sugar maple, were found only on that species and on one beech tree, indicating that these and probably most other epiphytes are not strictly host specific, but occur on additional trees of the correct age and stage. All the species found on only one tree species on Ampersand Mountain were also found on other host trees somewhere in New York State in Brown's, (1948) study; in other words, no species was host specific when the whole State was considered.

Some epiphytes switch preferred hosts with relatively small change in latitude, sometimes even where the host tree is present throughout the epiphyte's range. This has been shown in Europe (Barkman, 1958) and in Wisconsin (Hale, 1955). Conversely, the same host tree may bear different epiphytes in different regions. Sugar maple was found to support different "associations" in lower and upper Michigan, *Homallium adnatum* in the former, *Leucodon* and *Neckera* in the latter (Phillips, 1951), climatic differences being important in this study. Many species of epiphytic bryophytes are much more widely distributed than their host trees. For example, many of the species found on American beech (*Fagus grandifolia*) are also present as epiphytes in Europe, but on European beech, *Fagus sylvatica*. But often they also occur on unrelated tree species. Moreover, bryophytes, such as *Neckera*, *Homalia*, and *Leucodon*, which are restricted to or generally occur on trees in tropical and temperate regions, and are found solely as epiphytes in the present study, are epipetric in treeless arctic or alpine regions.

Such switches of substrate are also seen in temperate regions. For example, the liverwort *Frullania asagrayana*, a common Adirondack epiphyte, is found in Minnesota on rock walls. The majority of epiphytes found in the Ampersand study, for example, *Mnium* and *Brachythecium* species, are facultative, not obligate epiphytes. Most of them occur also on rock, soil, or dead wood. Many species occur on both soil and trees, a smaller number on rock and trees, but rarely is a species found on all three substrates. The preferred habitat within one region may be dependent on climate, as noted above. Species epiphytic on beech in the Adirondacks or the Upper Peninsula of Michigan do not occur on beech at Kenrose Preserve (this study) or in lower Michigan (Phillips, 1951). The climate in the two more southern areas is less cool and humid, and the beech trunk habitat correspondingly more xeric. Many of these species do occur at Kenrose and in lower Michigan, but on the ground or on moist logs. A similar change from epiphytic to terrestrial habitats can be seen in Finland (Barkman, 1958).

Few, if any, temperate bryophytes are host-specific in the same sense as fungal parasites of plants. The

host tree, sometimes called a phorophyte to distinguish it from a parasite host, is merely a substrate. The actual bryophyte substrate is usually dead bark tissue. Bryophytes exhibit habitat preference (or degrees of tolerance) in relation to roughness of bark, as well as bark acidity and other chemistry. It appears that relatively few species are tolerant of the tannin in hemlock bark. Roughness of bark is related to water-holding capacity; some epiphytes are found only in fissures or knotholes of the otherwise smooth bark of beech. Some of these variables have been measured (e.g., Hosokawa, et al., 1964; Grubb, et al., 1969), but it is often difficult to interpret factor interactions.

Host tree preferences of closely related species were examined for possible niche separation. More than one species of each of seven genera were present, including two species of *Anomodon*, *Brachythecium*, *Dicranum*, *Mnium*, *Pylaisiella*, and *Hypnum*, as well as three species of *Frullania*. Two species of each of these genera were recorded on one species of tree, indicating that habitat selection in terms of tree species is not all-important for niche separation. (Intragenic niche separation in terms of substrate certainly occurs in some of these genera. Two closely related species of *Dicranum*, for example, occur in the Ampersand study area, *Dicranum viride* on wood, as an epiphyte and elsewhere, and *D. fulvum* on rock.)

Data for presence (+) or absence (–) of the tree species of *Frullania* on the four host trees are given below:

| | <i>Betula</i> | <i>Tsugu</i> | <i>Fagus</i> | <i>Acer</i> |
|-----------------------|---------------|--------------|--------------|-------------|
| <i>F. asagrayana</i> | + | + | + | + |
| <i>F. eboracensis</i> | + | – | + | + |
| <i>F. inflata</i> | + | – | + | – |

The fundamental niches (Hutchinson, 1957) of these species probably differ. The fact that *F. asagrayana* was the only species found on hemlock bears out Schuster's (1953) comment that it is the most xerophytic of these *Frullania* species. Niche overlap does, however, appear to be present at least in terms of tree species, and I could discover no habitat preference on the tree itself, for example, north vs. south side, for any of the species. A fourth species, *F. bolanderi*, present in New York but not found in this study, occurs on all four of these trees in Michigan (Phillips, 1951). On the other hand, on only three occasions were two of the *Frullania* species found on the same individual tree. It appears that these sympatric, congeneric species do not have well separated niches; I think they are opportunistic species kept apart largely by stochastic factors. The role of bryophytes as opportunists is discussed below.

It should be noted that epiphytic bryophytes occur on other tree species as well as the four studied on Ampersand and Whiteface Mountains. At lower eleva-

tions, these included *Fraxinus americanus*, *Quercus borealis*, *Ostrya virginiana*, and *Acer rubrum*. At higher elevations, epiphytes were found on *Picea rubens*, *Abies balsamea*, *Pyrus melanocarpa*, and *Betula papyrifera* v. *cordifolia*. Trees of the same genus do not necessarily have similar epiphyte floras; those of *Betula alleghaniensis* and *B. papyrifera* and of *Acer rubrum* and *A. saccharum* are not similar. *Ostrya virginiana*, on the other hand, has a similar epiphyte flora to that of *Acer saccharum*. Bark characteristics are more important than genetic relationships except where these result in similar bark chemistry, as is probably true in the black oak group. All the bryophyte species found as epiphytes on the trees at higher elevations on Ampersand (i.e., spruce-fir zone), as well as all those found by Brown (1948) at four other Adirondack stations, were found also in nonepiphytic habitats in this zone. The epiphytic habitat thus does not increase the bryophyte diversity in terms of species richness at higher elevations on these mountains. That it adds significantly to species richness at lower elevations in the Adirondacks is shown by the present study on Ampersand Mountain.

Contrary to general European (Barkman, 1958), Japanese (Iwatsuki, 1960) and even some recent American (Hoffman and Kazmierski, 1969) practice, no attempt has been made to classify epiphyte communities (or associations, unions, etc.) on the trees on Ampersand Mountain. Although groups of species characteristic of particular trees, especially of sugar maple and hemlock, do occur, the particular combination of species varied with height and aspect even on a single tree, and on any one species of tree with size and location. Dynamic relationships appeared more obvious than fixed associations of species. In many places a bryophyte species, though still recognizable, was dead and had been overgrown by another species. Quarterman (1949) has studied bryophyte succession on red cedar bark, particularly in terms of changing dominants. She aged the trees by increment boring and, although she studied only nine trees, her demonstration of "dynamic behavior of bryophyte species" is impressive. I think this is a good approach to understanding relationships among epiphyte species. Doignon, as reported in Barkman (1958) studied actual succession in time on a single tree over a 30-year period. This is perhaps the ideal method, but in the modern era of pollution and publish-or-perish policies, it seems unlikely that either the epiphytes or the ecologists would survive that long.

New ecological techniques have been applied recently to epiphyte-host systems (see Slack, 1976, for a review). Beals (1965), for example, used ordination methods in the study of corticolous bryophytes and lichens. With such methods, it is possible to sort out the importance of the host tree as substrate as com-

pared to the age or location of the tree. Gradient analysis can also be used with time as the gradient and measured changes in the importance of individual species, species groupings, total biomass and diversity. This can be done with individual trees, trees of one species in one location but of different ages. In the Southern Blue Ridge in North Carolina, I have observed and measured such changes on different aged trunks of the same sugar maple (Slack, 1976). If changes in microhabitat, such as water-holding capacity of bark, could also be measured in relation to time, this would constitute direct gradient analysis.

Another approach to epiphytic vegetation would be to treat trees as islands and to apply principles of island biogeography (MacArthur and Wilson, 1967). Invasion and extinction rates of epiphyte species could be measured and the influence of nearby "islands" determined. Although there has been much discussion of possible long-distance dispersal of bryophytes in relation to their strange geographical distributions (e.g., Crum, 1972), there is little information about their short-range dispersal. It would be interesting to determine whether adjacent trees of the same species and similar size have more similar species composition than those further apart. In the present study, adjacent trees of the same species were eliminated from the sample to avoid this possible factor, but it has not been measured as far as I can discover. In these Adirondack forests, this factor could be tested by using trees that are regularly present but uncommon and have distinctive epiphyte floras. Examples would be hop hornbeam, *Ostrya virginiana* and white cedar, *Thuja occidentalis*, both of which are present together with the major species of the Ampersand study in a forest in the Adirondack Mountain Preserve near St. Huberts, N.Y., where I am currently investigating epiphytes.

Another interesting question in regard to host-epiphyte "island" systems is whether chance "invaders," those species such as *Hypnum imponens*, and *Mnium ciliare* or *M. punctatum*, which are not primarily found as epiphytes, persist for any length of time on these tree "islands" in competition with more usual epiphyte species. An even more intriguing question, which must have been asked by all earlier pursuers of epiphytes and is mentioned by a few, is why are there so many "empty islands?" A tree of the same species and of similar size may grow next to one covered with epiphytes and yet be completely barren of them itself, for no apparent reason. In addition to that source of "empty islands," each new young tree as it grows, like a new oceanic island produced by volcanic activity, represents a new target for invasion. Thus, a continuous supply of open niches for epiphytes exists even in a mature or climax forest.

The relationship between productivity and diversity,

one of considerable current interest (Whittaker, 1967; Loucks, 1970; Auclair and Goff, 1971; Goodman, 1975), can also be considered in regard to epiphytic systems. Whether high diversity, even for trees, can generally be related to high productivity, as Loucks contended, has been questioned by others (Whittaker, 1965; Auclair and Goff, 1969). I have herein questioned this relationship for bryophytes generally; higher diversity did not necessarily accompany the much higher bryophyte productivity found in the spruce-fir forest as compared to the deciduous forest. The same appears to be true in terms of epiphyte productivity and diversity. From my own experience in the Pacific Northwest and from studies in Oregon (Pike, et al, 1975) and in the Olympic Peninsula, (Hoffman, 1971), where extensive mats of epiphytic bryophytes are present, diversity of epiphytes is no greater than in the Adirondacks. The diversity of epiphytes on Ampersand seems high in view of the much lower productivity of epiphytic bryophytes there than in the Northwest. This question needs further quantitative investigation, especially of trees other than *Pseudotsuga menziesii*, on which most of the western studies have been conducted. I have found both higher productivity and higher species richness of epiphytes in the Southern Blue Ridge than in the Adirondacks, but this probably is a result of historical as well as climatic factors (see Anderson and Zander, 1973, and Slack, 1976).

Although much is to be learned from further quantitative studies of epiphytes and from the measurement of ecological factors affecting them, some of these factors can only be distinguished experimentally. Transplant experiments of the sort that Brodo (1961, 1968) has done with lichen epiphytes could be used to study the substrate factor vs. other factors, such as location on the tree or in the forest. Barkman (1958) suggested other methods of experimental manipulation, such as putting up a baffle to prevent water movement down the trunk, or removing certain species to determine the effects of competition. Trees could be thinned to change the light intensity; some balance between sufficient light for photosynthesis and the detrimental effects of heat and exposure in increasing transpiration rate appear to be important. Climatic factors are of primary importance since epiphytes generally occur in areas of high rainfall and low evapo-transpiration rates, but great differences also exist within a single forest. Manmade factors, which also affect epiphyte growth on the tree species studied here, include nutrient-rich roadside dust, probably a partially unrecognized factor in epiphyte studies, and toxic substances near cities or factories, a human disturbance much studied particularly in relation to lichens but also to bryophytes (e.g., LeBlanc, 1961, LeBlanc and Sloover, 1970, and Nash, 1972, for Eastern North American trees). Whether the

investigator uses disturbances created by others, as with pollution effects, or creates his or her own less drastic perturbations, much can be learned from such studies. It seems to me that the living tree with its epiphytes is an easier system to disturb, and thus to study experimentally, than most other aspects of plant communities.

In conclusion, the present study presents well-replicated data on diversity, in terms of species richness, for the four dominant trees of the hemlock-hardwood forest of northern New York. Many suggestions for further research are given. Additional quantitative data, the techniques of gradient analysis and of island biogeography would make possible the study of dynamic relationships of epiphytes. Lichens should be included in future epiphyte studies; competitive relationships between bryophytes and lichens are obvious to an ecologist looking at epiphytes. The majority of past epiphyte studies, however, have been done by specialists on one taxonomic group such as hepatics or lichens in temperate regions, or orchids in the tropics, rather than by ecologists. The interesting problems that epiphytes present to the ecologist are made difficult by the problems of identifying cryptogams (which are omitted from most investigations of plant community ecology for the same reason). Bryophytes, wrote Crundwell (1970), are "the wrong size." They must be identified by a combination of macroscopic and microscopic characters. If we were the size of cockroaches, he wrote, bryophytes would all look distinctive and would even be known by vernacular names "to the cockroach in the street." The same problems apply to lichens, but these problems are not insuperable, even for noncockroach-sized ecologists. Theoretical ecology would also benefit from the study of epiphyte systems.

Results of the Kenrose Preserve Study

The elevations studied at Kenrose Preserve ranged from 1120 to 1510 ft (335–457 m), thus nearly reaching the lowest elevation on Whiteface and Ampersand Mountains, 1600 ft (488 m). The forests at Kenrose Preserve are of entirely deciduous hemlock-hardwood, except for a small admixture of white pine. Many of the same trees, such as *Acer saccharum*, *Acer rubrum*, *Acer pennsylvanicum*, *Fagus grandifolia* and *Tsuga canadensis* are present as on the lower Adirondack slopes. While ash, (*Fraxinus americanus*) is, however, more common at Kenrose. Also, oak-hickory (*Quercus borealis*, *Carya ovata*) forest is present at Kenrose Preserve, but not on Whiteface or Ampersand.

I wanted to determine whether the limited range of elevation at Kenrose Preserve affected the diversity of bryophytes. Both H' and S are plotted against elevation in figure 19. Elevation is significantly correlated with H' ($r = 0.66$). In general, higher elevations have



Mixed deciduous forest, Kenrose Preserve showing open aspect.

greater bryophyte diversity than lower elevations at Kenrose, the major exception being at 1380 ft (420 m), where station 5 shows greater diversity (H') than the highest stations at 1510 ft (457 m). Station 5 also has high species richness (S), but other stations at 1380 ft show considerable variability in both H' and S . Elevation is also significantly correlated with degrees of slope ($r = 0.50$), and is negatively correlated with pH ($r = 0.54$). Thus elevation is here, as elsewhere, a complex variable.

Diversity (H') is plotted against log (percent cover) of all bryophytes in figure 20. The correlation coefficient between H' and percent cover is significant (0.65). There was no consistent relationship between bryophyte cover and diversity (H') for the Adirondack quadrats. For the spruce-fir and arctic-alpine zones, the correlation between cover and diversity was negative. For the deciduous forest it was positive, significantly so on Ampersand ($r = 0.98$ for four quadrats). Further investigation is needed. Diversity (H') appears to be low with low percent cover of bryophytes and high where the bryophyte cover is unusually high, but there is a significant amount of variations in intermediate cover values (figure 20).

Figure 21 shows diversity (H') plotted against $\log_e S$ for Kenrose bryophytes, from which it can be seen that $\log_e S$ is a relatively good predictor of diversity (H'); i.e., an approximately straight line relationship is seen on the graph. (See also multiple regression analysis below.) This means that the evenness component of diversity (J') is relatively constant. The J' values do show less variation than in the Adirondacks; all but three of these values fall between 0.52 and 0.75. Thirty percent of the J' values were under 0.6 and 75 percent under 0.7, with a mean of 0.63, which are low values as compared with those found by other workers for birds (Tramer, 1969) and for higher plants (Pielou, 1966). Adirondack values were mostly low, also. The most extreme low evenness value ($J = .31$) at Kenrose was at a station at the base of an unstable steep bank down which water runs each spring. Only one species of moss, *Fissidens taxifolius*, appears to be well adapted to these conditions and accounts for 87 percent of the bryophyte coverage.

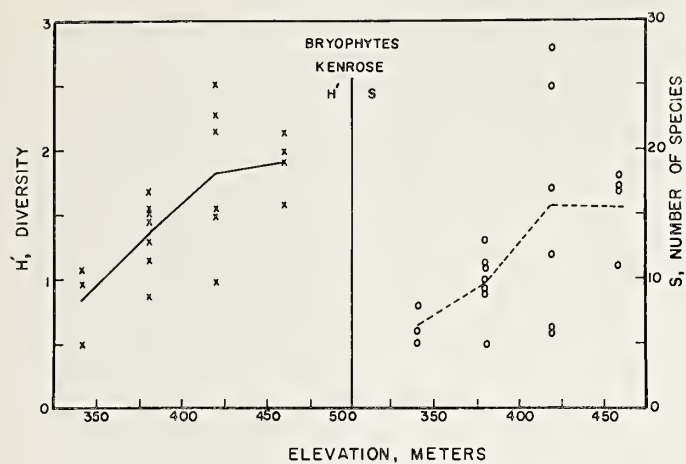


FIGURE 19 Changes in species richness (S) and diversity (H') of bryophytes with elevation change at Kenrose Preserve

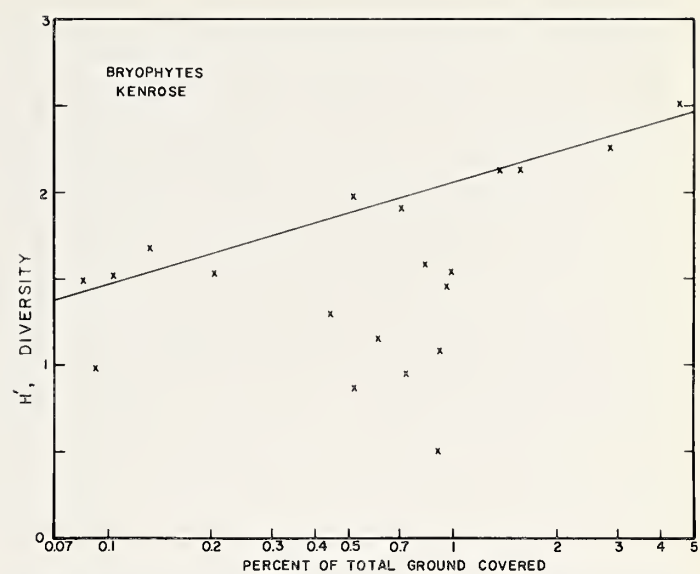


FIGURE 20 Diversity (H') versus log of percent cover of bryophytes at Kenrose Preserve

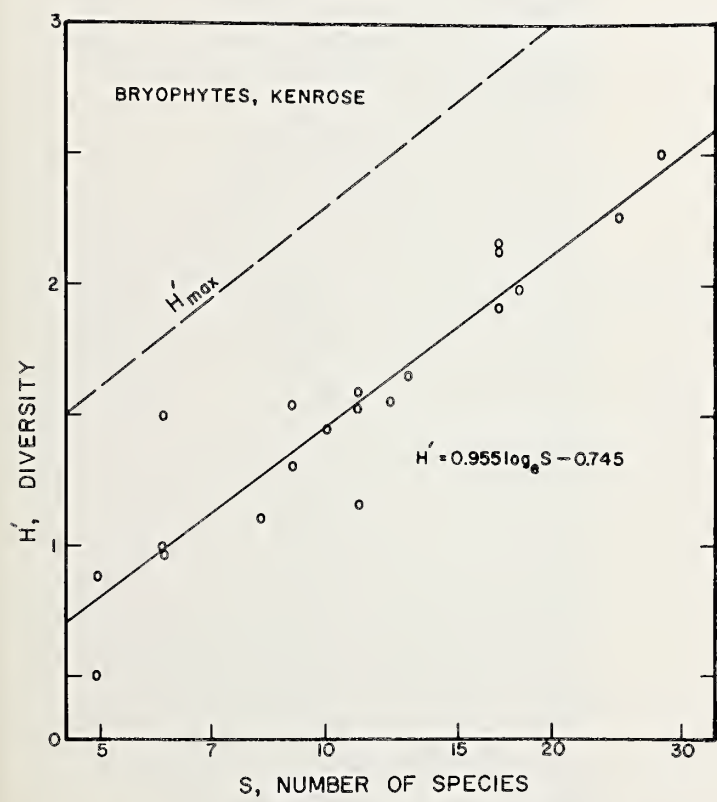


FIGURE 21 Diversity (H') plotted against species richness ($\log_e S$) for bryophytes at Kenrose Preserve

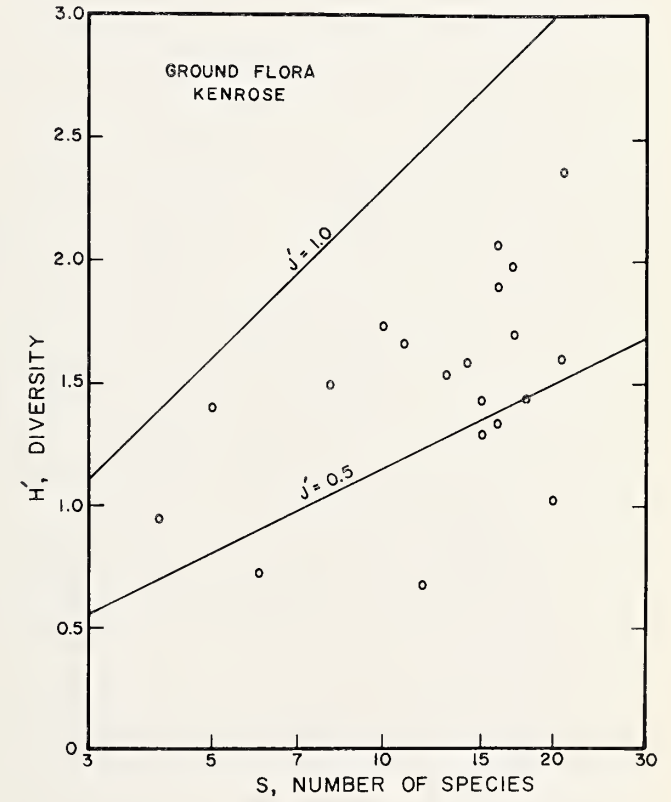


FIGURE 22 Diversity (H') plotted against species richness ($\log_e S$) for ground flora at Kenrose Preserve

Figure 22 shows the relationship between H' and $\log_e S$ for the vascular ground flora at Kenrose Preserve. The majority (65%) of the quadrats have J' values between 0.50 and 0.75, a very similar range to that for bryophytes in almost all quadrats. Low J' values for ground flora, however, do not coincide with low J' values for bryophytes. Dominance relationships for bryophytes are thus independent of dominance relationships for the vascular ground flora. Several vascular plants, for example, are adapted to the unstable bank conditions where *Fissidens taxifolius* was the only important bryophyte.

When bryophyte diversity (H') is compared with that for vascular ground flora, an interesting relationship appears. At the higher elevations, bryophytes show higher diversity for almost all quadrats. Below about 1300 ft (400 m), the opposite is true; that is, all the quadrats at 1120 ft (340 m) and the majority at 1250 ft (380 m) show higher diversity of ground flora. It appears from the soil data (see below) that such factors as high calcium and concomitant high pH as well as poor drainage found at the lower elevations may limit bryophyte diversity more than that of vascular plants. Even shrubs show higher diversity than bryophytes in two quadrats at the lowest elevations, 1120 ft (340 m). At all other elevations at Kenrose (fig. 23) and at all stations in the Adirondacks, bryophyte diversity is higher than that of shrubs.

The number of tree species (S) and dominant tree species at the four elevations at Kenrose are seen in figure 24 in relation to bryophyte diversity. The number of tree species per quadrat is correlated with diversity of bryophytes ($r = 0.59$). Highest bryophyte diversity is found in quadrats in which sugar maple is one of the dominants, with several other trees such as hemlock, striped maple, and ash as associates. Diversity is lowest in quadrats in which ash is the sole dominant. High diversity was found also in the oak-hickory forest present on the crest of a hill at 1500 ft (525 m) and above. Although diversity here is not as high ($H' = 1.98$) as in some of the quadrats under sugar maple ($H' = 2.3, 2.5$), seven of the 18 species found in this oak-hickory forest were not found elsewhere in the Kenrose study. Thus, forest type can add to the overall beta diversity for an area whether or not one type of forest has a more diverse bryophyte flora than another. This was found to be true in the Adirondack study areas which encompassed both deciduous and conifer forest, but that it is true even within the deciduous forest biome shown here.

Many environmental factors were measured at Kenrose Preserve. These measurements were made in the same quadrats in which the vegetation was investigated by Carl George and associates. (See Study Area section.) The following variables, which might have some significance for bryophyte diversity, were se-

lected for a multiple regression analysis: elevation, degree of slope, percent of full sun under tree canopy, pH of soil, calcium content of soil, soil temperature, relative humidity, and maximum air temperature. In addition, the following aspects of the vegetation were included in the analysis: total density of bryophytes per 4 by 16 meter quadrat, total density of vascular plants, $\log_e S$ for bryophytes, and number of tree species. Other variables, such as soil type, slope angle, phosphorus and organic content of soil, and minimum summer temperature were eliminated earlier when no correlation with bryophyte diversity was found for any of these factors. Two factors not included may be important. These are drainage, which ranges from poor to good in the study area, and the relative maturity of the forest. Good drainage and later successional stages appeared to favor bryophyte diversity, but neither of these variables had been sufficiently quantified to use in the regression analysis.

Hemlock-hardwood forest, Kenrose Preserve, *Acer saccharum* and *Tsuga canadensis* dominants. Bryophyte diversity was high in forests where sugar maple was dominant.



(photo by C. J. George)

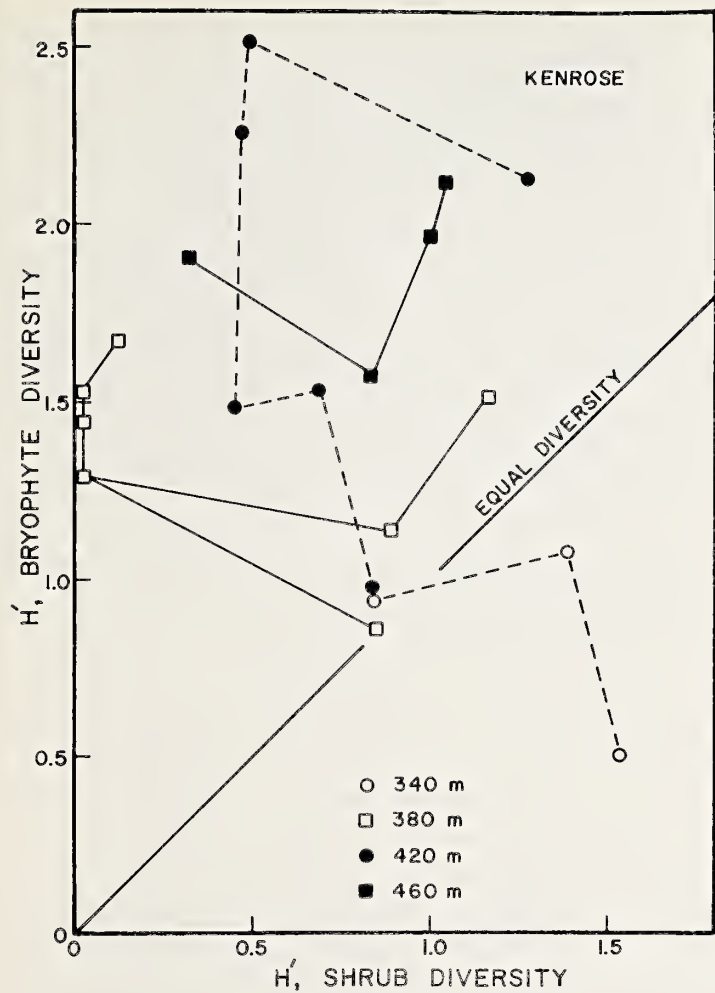
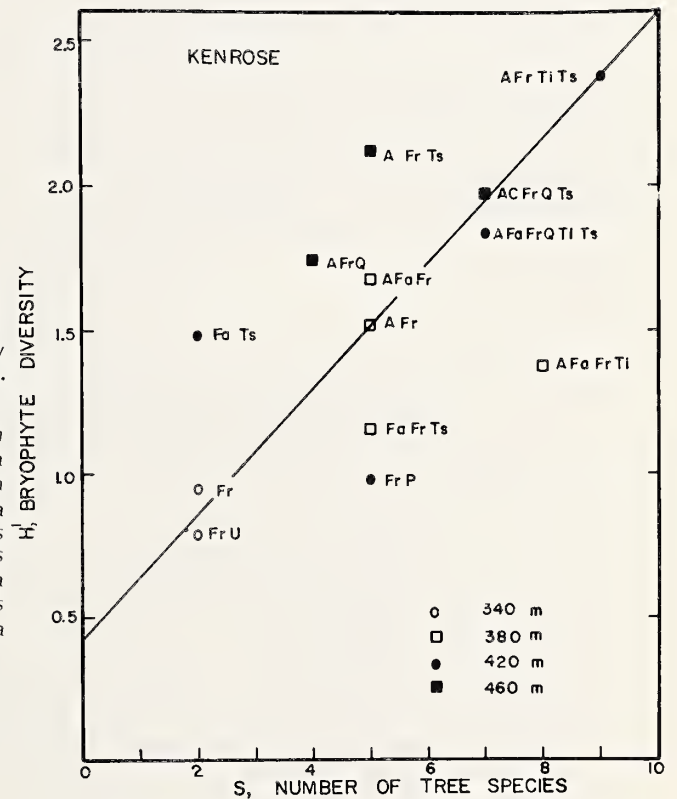


FIGURE 23 Bryophyte diversity (H') plotted against shrub diversity (H') at Kenrose Preserve

FIGURE 24 Number of tree species (S) in relation to bryophyte diversity (H'). Dominant tree species at each of the four elevations are also shown. Key:

A *Acer saccharum*
 C *Carya ovata*
 Fa *Fagus grandifolia*
 Fr *Fraxinus americana*
 P *Pinus strobus*
 Q *Quercus borealis*
 Ti *Tilia americana*
 Ts *Tsuga canadensis*
 U *Ulmus americana*



Regression Analysis

Four separate analyses were made using some or all of the 11 variables, in a stepwise multiple regression analysis program (STEPREGI; SUNYA Code: STAT/02). The results of the regression analyses are shown in table 7. Correlation coefficients between bryophyte diversity (H') and various environmental and other parameters are shown in table 7b. The entire correlation matrix is given in table 8.

The first analysis (1, table 7a utilized $\log_e S$ (or H'_{max}) only. (Recall the evenness component of diversity, $J' = H'/H'_{max}$). As stated above, the evenness component of bryophyte diversity was low but rela-

tively consistent. Therefore, at Kenrose (but not in the two Adirondack study areas), diversity (H') can be predicted reasonably well from the number of species present. The coefficient of determination is 0.87; the regression equation predicts H' from $\log_e S$ as follows:

$$H' = 0.9553 \log_e S - 0.745$$

When all variables except $\log_e S$ are retained in the regression analysis (2, table 7a), only elevation and bryophyte percent cover were significant, although several other variables are significantly correlated with H' . These other variables are not significant in the regression analysis because they themselves are correlated with the significant variables (table 8). For exam-

TABLE 7a
Results of Stepwise Multiple Regression Program for
Environmental Factors and Other Parameters Determining
Bryophyte Diversity (H') at Kenrose Preserve

| Type of Analysis | variables | Reg. Coeff. | Std. Error | T | Coeff. Det. |
|---|--------------------|-------------|------------|-------|-------------|
| 1. $\log_e S (=H'_{max})$ | Log S (bryophytes) | 0.955 | 0.087 | 11.01 | 0.87 |
| | (cumulative) | | | | |
| 2. Best X (excluding $\log_e S$) | Elevation | 0.0021 | 0.0005 | 4.25 | (0.47) |
| | Bryophyte cover | 0.0000 | 0.0000 | 3.13 | 0.72 |
| | (No. tree species | 0.0535 | 0.0304 | 1.76 | 0.77) |
| 3. Best X (excluding all bryophyte variables) | Elevation | 0.0023 | 0.0006 | 3.67 | (0.47) |
| | No. tree species | 0.0919 | 0.0342 | 2.69 | 0.67 |
| 4. Best X (excluding all plant variables) | Elevation | 0.0021 | 0.0007 | 2.93 | (0.47) |
| | Slope (degrees) | 0.0219 | 0.0111 | 1.98 | 0.57 |

TABLE 7b
Correlation Coefficients Between Bryophyte Diversity (H') and
Environmental and Other Parameters at Kenrose Preserve

Significant correlation coefficients with H'

| | |
|---------------------------|-------|
| $\log_e S (=H'_{max})$ | 0.93 |
| Percent cover, bryophytes | 0.63 |
| Number of tree species | 0.58 |
| Degree of slope | 0.59 |
| pH of soil | -0.45 |

Nonsignificant correlation coefficients with H'

| | |
|-----------------------------|-------|
| Percent cover, vasc. plants | 0.037 |
| Percent of full sun | -0.14 |
| Calcium (kg/hectare) | -0.36 |
| Soil temperature | 0.087 |
| Maximum air temperature | 0.099 |
| Relative humidity | 0.072 |

ple, the number of tree species (table 7b) would raise the coefficient of determination to 0.77 but is not quite significant in the present analysis (2) because of its correlation with bryophyte cover (Denbry, table 8).

The third equation used (3, table 7a) excluded all bryophyte variables including bryophyte cover. Here elevation and number of tree species had significant regression coefficients and together account for 67 percent of the variation in H'.

Finally, a fourth analysis (4, table 7a) utilized an equation excluding all the plant variables, using only nonbiotic factors. Here elevation and the degrees of slope, the latter being only marginally significant, accounted for 57 percent of the variation in H'. Although elevation alone accounts for almost half of the variation in bryophyte diversity (H'), biotic factors are also important variables, and together with elevation account for about 75 percent of the variation found.

It should be noted that pH has a significant negative correlation ($r = 0.45$) with H' but does not have a significant regression coefficient in any of these analyses. This is explained by the fact that soil pH also has a significant negative correlation with slope ($r = -0.79$) and with elevation ($r = -0.47$), both of which were used in all analyses. Brophyte diversity in this study is low where the pH is high (pH 6 or above), and these quadrats are in areas of both low elevation and low slope at Kenrose. The pH of the soil was found to be correlated with Kg/hectare of calcium in the soil ($r = 0.88$), high pH resulting from high calcium. The correlation between calcium and diversity is not quite significant ($r = -0.36$); very high calcium is associated with low diversity, but so is very low calcium. Intermediate ranges of calcium have little relationship to diversity. The relationships between soil calcium, ele-

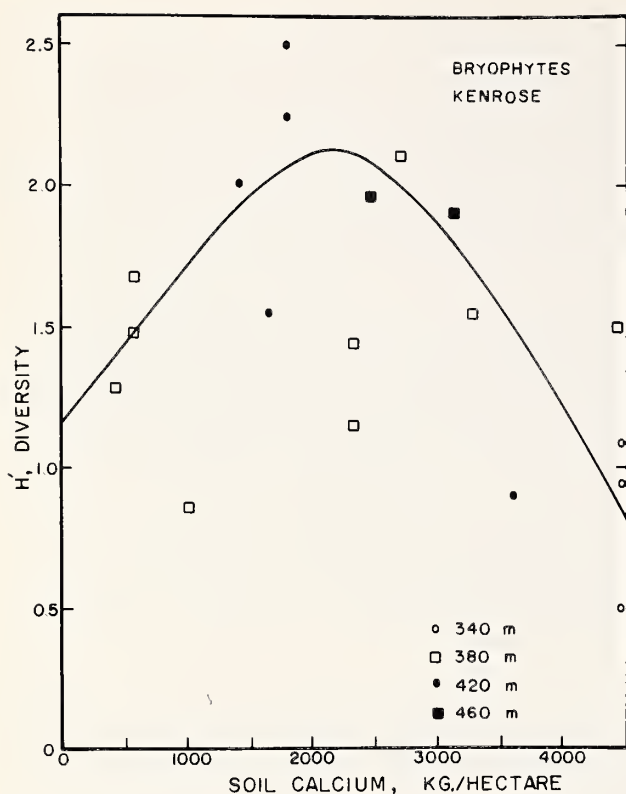
vation, and bryophyte diversity (H') can be seen in figure 25. I interpret these data to indicate that the tolerance range for bryophytes both in terms of biomass (measured as total percent cover) and of diversity (H') is limited by low and very high calcium. In the intermediate range for soil calcium, presumably optimal for most forest bryophytes, diversity and biomass are limited by other factors such as humidity, or more likely by an interaction of such factors.

Elevation, even over the short range found at Kenrose Preserve, is a complex variable involving slope angle, soil chemistry, and probably soil drainage as well. Even more complex interactions are indicated. Slope angle, for example, was found to influence temperature, incident light, and relative humidity, none of which, when examined separately, was found to be a significant determinant of diversity. Such interactions cannot always be sorted out by multiple regression analysis techniques. Ultimately, experimentation is needed.

Perhaps the most striking result of the study of microclimatic variables at Kenrose was that so few of them were significantly correlated with diversity. Two conclusions can be drawn from this result: first, some variables such as summer soil and air temperatures are probably not relevant to bryophyte growth or diversity over the small range of these factors within the study area. The same factors might be important in a similar-sized or smaller area in which the microclimates are more severe, such as the summit of Whiteface Mountain. Important studies correlating microclimate and plant growth, such as those of Bliss (1969), have been made in areas with sharp microclimatic gradients.

TABLE 8
Correlation Matrix for Environmental and Other Parameters at Kenrose Preserve

| H' _{max} | Denbry | Denvasc. | Trees | Slope | Elev. | %Sun | pH | Ca. | Soil temp. | Rel. hum. | Max. temp. | H' |
|-------------------|--------|----------|-------|-------|-------|------|-------|-------|------------|-----------|------------|-------------------|
| .64 | .043 | .65 | .53 | .59 | -.15 | -.36 | -.24 | .023 | .025 | .033 | .93 | H' _{max} |
| | .26 | .44 | .44 | .11 | -.19 | -.22 | -.059 | -.21 | .27 | .057 | .63 | Denbry |
| | | -.24 | -.14 | -.11 | .50 | .52 | .55 | -.010 | .015 | .090 | .037 | Denvasc. |
| | | | .44 | .31 | -.32 | -.44 | -.41 | -.16 | .19 | -.15 | .58 | Trees |
| | | | | .46 | -.26 | -.79 | -.60 | .16 | -.067 | .11 | .60 | Slope |
| | | | | | -.18 | -.47 | -.32 | .22 | -.14 | .29 | .66 | Elev. |
| | | | | | | .48 | .24 | .58 | -.57 | .23 | -.14 | %Sun |
| | | | | | | | .88 | -.30 | .26 | -.19 | -.45 | pH |
| | | | | | | | | -.45 | .51 | .012 | -.36 | Ca. |
| | | | | | | | | | -.94 | .50 | .087 | Soil temp. |
| | | | | | | | | | | -.34 | -.072 | Rel. hum. |
| | | | | | | | | | | | .099 | Max. temp. |
| | | | | | | | | | | | | H' |



Oak-hickory forest, Kenrose Preserve; seven bryophyte species were found only in this forest type at Kenrose.

FIGURE 25 The relationship between soil calcium, elevation and bryophyte diversity (H') at Kenrose Preserve

Second, microclimatic measurements should be as closely related as possible to the stratum or type of plant under study. Relative humidity and light intensity at two meters above ground level are appropriate to the shrub layer, but may be of little significance for bryophytes growing at two centimeters or less above the soil.

When I reexamined the high diversity quadrats at Kenrose Preserve after the completion of this study, I observed another probable factor affecting bryophyte diversity, the heterogeneity of the quadrat or station in terms of possible bryophyte substrates. Since most bryophytes cannot survive being covered by annual leaf fall, they are restricted in deciduous forest to substrates not covered by leaves. These include rotting logs, tree bases, tree trunks, outcropping rock, boulders, and steeply sloping ground. Such substrate diversity could be measured by the Shannon formula, using percentages of area covered by rock, logs, etc. Poulson and Culver (1969) have used a similar measure in their study of diversity of cave inhabitants (all heterotrophs), but it has not been used to my knowledge in alpha diversity studies of plant communities. Further subdivisions of substrate, for example, into acid and basic rock, decorticated logs and those with bark intact, etc., would also be appropriate in relation to bryophyte diversity. Different species are adapted to particular substrates as Mühle and LeBlanc (1975)

have recently shown for both mosses and hepatics on logs in various stages of decay. This method of study of alpha or within-habitat diversity would also be applicable to quite different communities, for example the attached microflora and fauna of freshwater ponds, where the substrates would be macrophytes, filamentous algae, wood, etc.

Beta or between-habitat diversity was evident at Kenrose Preserve in spite of the small elevation gradient. Cluster analysis (see Slack, 1971) showed that clusters of quadrats at the same station all had significant B-coefficients based on the Sørensen index for species similarity, whereas clusters of quadrats including the highest and lowest elevations have B-coefficients ranging down to zero, that is, zero similarity of species composition within a cluster. Beta diversity is also evident in the species composition of the station in dry oak-hickory forest. In one 4 by 16 quadrat at this station, seven species of mosses were recorded that were not found elsewhere in the Kenrose Preserve study.

Taxonomic Diversity

Table 9 shows the partitioning of bryophyte diversity (H') into components by family, genus, and species. If each species in a quadrat belongs to a different family, 100 percent of the diversity is family di-

versity. This was the case in the low diversity quadrats at Kenrose Preserve. Similarly, if each species belongs to a different genus, 100 percent of the H' diversity is family plus genus diversity. If there are thus no congeneric species, H' is the same whether calculated by species or by genera, as in arctic-alpine quadrat 21 on Whiteface Mountain. (See the last column of table 9 for H' calculated by genera.)

Where H' is high, as in the spruce-fir quadrats at Whiteface and in some of the deciduous forest quadrats at Kenrose Preserve, it can be seen (table 9) that a relatively high percentage of the diversity is at the species level; that is, many belong to the same genera. For these high diversity quadrats ($H' = 2.13$ to 2.63), the percentage of diversity resulting from congeneric species ranged from 10.4 to 16.0 (mean = 13.5). For the two highest diversity quadrats in these two locations (3 at Kenrose and 20 at Whiteface; see table 9) generic diversity was also high, 11.0 and 12.9 percent, respectively. These two quadrats also had high specific diversity (because of congeneric species), indicating that species packing goes on at both the generic and specific levels where there are many species per quad-

rat. Other quadrats in these two groups (table 9) show generally low generic diversity, from 1.9 to 6.3 percent (mean = 3.9). In all of the quadrats discussed above, the familial fraction of diversity is high, from 71 to 86 percent, that is up to 86 percent of the species in a quadrat are members of different families. When I compared these with those of Lloyd Inger, and King (1968), who partitioned diversity of amphibians and reptiles of a Bornean rain forest, I found the familial fraction of diversity in their study much lower, up to 50 percent for frogs and lower for lizards and snakes. These three groups, however, constituted a total of only 15 families, whereas over 40 bryophyte families are represented in the present study. The generic fraction of diversity for both amphibians and reptiles was higher than in my bryophytic study as is the specific fraction for frogs and lizards, but not for snakes. The authors concluded that "only a small part of the total species diversity. . . is attributable to congeneric species living together," but actually that percentage was 20 percent for frogs and 27 percent for lizards; these percentages do not seem to me to be insignificant.

TABLE 9
Taxonomic Diversity—Partitioning of H'
by families, genera and species

| Quadrat No. | Total
Diversity (H') | % Family | % Genera | % Species | Diversity (H')
by Genera |
|--|-----------------------------|----------|----------|-----------|---------------------------------|
| Whiteface Mt.—Spruce-fir quadrats | | | | | |
| 16 | 2.29 | 78.60 | 6.32 | 15.08 | 1.94 |
| 18 | 2.28 | 86.07 | 3.50 | 10.43 | 2.04 |
| 20 | 2.63 | 71.08 | 12.92 | 16.00 | 2.21 |
| Whiteface Mt.—Arctic-alpine quadrats | | | | | |
| 21 | 2.13 | 82.96 | 17.04 | 0.00 | 2.13 |
| 22 | 1.37 | 94.53 | 0.00 | 5.47 | 1.30 |
| 23 | 1.54 | 52.77 | 21.28 | 25.95 | 1.14 |
| 24 | 0.56 | 25.13 | 69.38 | 5.49 | 0.53 |
| 25 | 1.66 | 75.07 | 16.52 | 8.41 | 1.52 |
| Kenrose Preserve—Deciduous forest quadrats | | | | | |
| Low diversity quadrats | | | | | |
| 8 | 0.50 | 100.00 | 0.00 | 0.00 | 0.50 |
| 11 | 0.98 | 100.00 | 0.00 | 0.00 | 0.98 |
| 15 | 0.95 | 100.00 | 0.00 | 0.00 | 0.95 |
| 17 | 0.86 | 100.00 | 0.00 | 0.00 | 0.86 |
| High diversity quadrats | | | | | |
| 3 | 2.51 | 74.12 | 10.95 | 14.93 | 2.14 |
| 4 | 2.26 | 85.94 | 1.93 | 12.13 | 1.98 |
| 12 | 2.13 | 85.33 | 3.54 | 11.13 | 1.90 |
| 18 | 2.14 | 80.76 | 4.17 | 15.07 | 1.81 |

Species diversity was also partitioned for two other groups of quadrats: the low diversity quadrats (H' less than 1.0) at Kenrose, and the five arctic-alpine quadrats at Whiteface. In all four of these Kenrose quadrats (table 9) the familial diversity was 100 percent; that is, each of the species belonged to a different family. This result is not surprising since the total number of species for these quadrats ranges only from five to nine; a random selection of species could yield this result. Apparently, species belonging to several different families are adapted to conditions in these quadrats: high soil calcium, high pH, and instability because of spring soil movement. High Percentage Similarity between some of these quadrats, especially the value of 0.77 for quadrats 8 and 15, which are separated from each other, indicates that certain species are indeed specialists for these conditions.

The arctic-alpine quadrats differ greatly from each other when diversity (H') is partitioned into familial, generic, and specific portions. Quadrats 23 and 24 (table 9) have the highest specific diversity (26 percent) and/or generic diversity (69 percent) of any of the quadrats computed, whereas two other quadrats (21 and 22) have 0.0 specific and generic diversity, respectively. Quadrats 21, 22, and 25 show high familial diversity (75 to 95 percent of the species belonging to different families). In 23 and 24, however, only 25 and 53 percent of the diversity is familial. In these quadrats, two families, Grimmiaceae and Polytrichaceae and three genera, *Grimmia*, *Polytrichum*, and *Pogonatum* account for a large percentage of total diversity. A total of seven species is involved. These genera, and particularly their representatives on the summit of Whiteface, have adapted to the high winds and insolation found on the summit by the reduction of transpiration. In these quadrats, the selection of a few species from a large number of families is not random, as it may be in the low diversity quadrats at Kenrose; a much smaller number of families have representatives adapted to these severe arctic-alpine conditions.

Figure 26 shows some general relationship between the number of congeners and the number of species (S) for all Kenrose quadrats; quadrats with large numbers of species tend to have more congeners than those low species richness. The quadrat with highest species richness had 14 congeners, indicating that high species diversities are made possible, at least in part, by species packing and habitat selection in such genera as *Dicranum* (see below). On the other hand, MacArthur (1969) has pointed out that the higher number of bird species within a limited area in the tropics may be largely an increase in genera rather than in congeneric species. He cites an example from Barro Colorado Island, Panama, compared with a

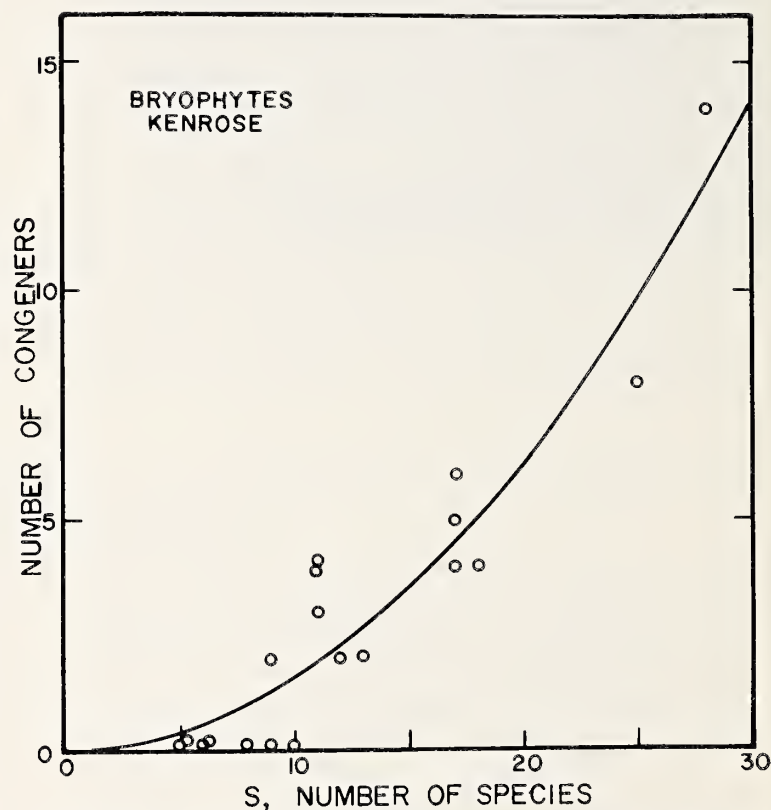


FIGURE 26 Number of congeneric bryophyte species in relation to species richness (S) at Kenrose Preserve

Vermont woodland. Simpson (1964) has pointed out the increase in the number of families of recent mammals in the American tropics as compared with the temperate zone.

There is much evidence, however, that a large percentage of tropical diversity, at least for plants, is at the specific level. Tropical congeners abound both in bryophytes and vascular plants. The liverwort genus, *Plagiochila*, which has only one representative in New York State, is tremendously diverse in the tropics, with several hundred species, many occurring together (Schuster, 1966, S. R. Gradstein, personal communication). Richards (1969) noted that the large number of species of several different vascular genera, *Shorea* and *Miconia*, for example, which occur as congeners in the tropical rain forest in Asia and tropical America, respectively.

My data suggest that the relative number of bryophyte congeners increases in both difficult low diversity habitats and in very favorable high diversity habitats. The large number of congeners in high diversity areas may be a widespread phenomenon in plants and perhaps in some groups of animals also. Wake (1970) notes the remarkable speciation of one tribe of tropical salamanders, the Bolitoglossini of the family Plethodontidae. He attributes this speciation to the availability of numerous types of niche that are suitable for these salamanders in the tropics.

From the analysis of taxonomic diversity, I conclude that the species is the most appropriate level on which to study bryophyte diversity. Questions that are raised concerning taxonomic diversity can also be examined by analyzing habitat preferences of congeneric species occurring in the same quadrat. Johnson and Raven (1970) state that a forest with four different oaks should be considered just as diverse as one with species of four different genera as dominants. I think that at least as good a case can be made for some bryophyte genera in the present study as for oaks. Consider, for example, the moss genus, *Dicranum*, of which at least six relatively common species occurs in the Adirondacks. Three species of *Dicranum* were found as congeners in 70 percent of the spruce-fir and deciduous quadrats at Whiteface and Ampersand Mountains; 25 percent of the quadrats contained four species of *Dicranum*. The various species were found to have distinct habitat preferences which, although not absolute, are at least as well marked as between many species of different genera. For example, *Dicranum fulvum* is found on rock, whereas the morphologically similar *Dicranum viride* is found on wood, sometimes as an epiphyte on tree trunks. *Dicranum montanum* is found in several habitats, but commonly on tree trunks. It is, however,

a more xeric species than *D. viride* and is often found higher up the trunk on the same species of tree, or on more xeric tree species. For example, *D. montanum* was regularly found on *Tsuga*; *D. viride* never was. (This might be due to chemical rather than water-holding differences in the bark, but in either case the two species of *Dicranum* show habitat preferences.)

Dicranum scoparium, although also occurring in rotten wood, was the only one of these species commonly found on the ground. *Dicranum fuscescens* was found on rotting wood, as was *D. flagellare*. Here there was at least a partial separation by elevation, with *D. fuscescens* at higher elevations. *Dicranum flagellare* occurs regularly on very rotten wood. Other species, such as *D. undulatum*, occur largely in boggy areas. In this genus at least, species are indeed ecological equivalents in terms of diversity. It would be possible, although somewhat more difficult, to make a similar case for congeneric species of *Hypnum* and even for most species of *Brachythecium* found in this study, some of which, however, are not congeneric in the same quadrat because of altitude preferences.

In a few genera, habitat preference was not evident among congeneric species. This was true for epiphytic species of *Frullania* on Ampersand Mountain and for arctic-alpine species of *Polytrichum*, *Pogonatum*, and *Grimmia*. These genera, all living under extreme conditions, seem to me to represent a different phenomenon from the above. The species of *Pogonatum* or *Grimmia* living on a treeless mountain summit and the species of *Frullania* living on the smooth, dry bark of a beech, are each similarly adapted to these particular environmental conditions. It seems that a community of three macroscopically similar *Frullania* species is less diverse than a *Neckera*, *Porella*, *Anomodon* community on a neighboring sugar maple, whose bark does not constitute so extreme an environment. The example of four oaks may be more similar to that of the three *Frullania* species than to the *Dicranums*. Several species of oak may live under rather extreme conditions, such as those of drought and recurrent fire in the Albany pine bush (sand plains) area, and have similar adaptations to these conditions. For oaks in this sort of environment and for bryophyte genera of difficult environments, a good case could perhaps be made for studying diversity in terms of genera. The majority of the congeneric species of bryophytes in less extreme habitats in this study, however, showed ecological separation, although not in all genera as distinctly as in *Dicranum*.

Further Aspects of Community Structure

Populations, Communities, and the Elevation Gradient

Elevation has proved to be a very important variable for bryophyte species diversity in this study. The effect of elevation range within a large area, the changes in species composition of bryophytes (and also of vascular plants) over a 1000 m range of elevation in the Adirondacks, and diversity changes even over the 130 m range of elevation at Kenrose Preserve have all been documented in this research. Each plant stratum has been shown to have a different pattern of diversity (H') and of species richness (S) over the elevation gradient studied on the two Adirondack mountains. Numbers of species of mosses and especially of liverworts varied with elevation and with vegetation types resulting from elevation change. In New York State and also in other geographical areas, for example, Glacier National Park, Montana (Herman, 1969) and Costa Rica (Crosby, 1969), species richness of bryophytes is high in areas where the elevation gradient is large.

The type of analysis used in this research, especially that involving the comparison of species composition along the elevation gradients at Whiteface and Amper-sand and at Kenrose Preserve, is generally called direct gradient analysis (Whittaker, 1956, 1968, 1970). In contrast to this type, indirect gradient analysis is used where there are no obvious environmental gradients that can be measured; the latter are inferred from the vegetation samples themselves and their changes in species composition.

Population of single species can also be studied by direct gradient analysis. The term "plant community" has been used throughout this paper in Whittaker's (1967) sense of a "particular, limited area of vegetation which seems homogeneous." The vegetation of any particular quadrat may be considered a sample of the immediately surrounding homogeneous appearing community. These communities do not, however, have sharp boundaries except where a very sharp edaphic or topographic change occurs. Although the composition of these communities changes with elevation (as can be seen in this study from the Sørensen and Percent Similarity indices), this community change is a result of separate density changes for each species along the elevation gradient. The pattern of density change with elevation differs for each species and usually takes the form of a bell-shaped curve for tree species. Whittaker (1968) shows such curves for pines and oaks in the Great Smoky Mountains between 400 and 1400 m.

Similar curves can be drawn for beech, sugar maple, yellow birch, red spruce, and balsam fir from my Adirondack data, with peaks for each species as follows, based on density of individual trees:

| | |
|------------------------------|------------------|
| <i>Fagus grandifolia</i> | 1600 ft (490 m) |
| <i>Acer saccharum</i> | 2000 ft (610 m) |
| <i>Betula alleghaniensis</i> | 2800 ft (850 m) |
| <i>Picea rubens</i> | 2800 ft (850 m) |
| <i>Abies balsamea</i> | 4000 ft (1200 m) |

Curves for these species from 53 sites in the Whiteface area (Scott and Holway, 1964) show very similar peaks. Such changes with elevation for each species are not so marked over the much smaller elevation range at Kenrose Preserve, but even here some species, such as elm and ash, have their highest density at the lowest elevation while others, such as red oak and hickory, have highest density at the higher elevations. Some species, sugar maple, for example, are present throughout the elevation range at Kenrose.

When such curves are examined for individual bryophyte species, simple bell-shaped or binomial curves do not always result. The physiological tolerances of some species (c.f. *Andreaea rupestris*, fig. 12), enable them to live over the whole elevation range on Whiteface Mountain. For trees and almost all other vascular plants on Whiteface, the vertical distributions are limited by physiological tolerances, or where tolerances are marginal, by competition with other species better adapted at particular elevations. Sørensen and Percent Similarity values for vascular plants at 1600 ft (488 m) and at 4800 ft (1463 m) are all 0.0; i.e., no vascular plants extend over the entire elevation gradient. For bryophytes, however, the values for these indices, although very low, do not reach 0.0. Such species as *Andreaea rupestris* and *Grimmia apocarpa* occur in both deciduous forest and arctic-alpine vegetation on Whiteface. They are absent, however, where suitable rock substrate is not found; thus, plotting relative density (cover) vs. elevation for such species may result in bimodal or irregular rather than smooth binomial curves.

Figures 27 and 28 show generalized curves, prepared from the relative cover data, for 13 bryophyte species. It can be seen that each species has its own distribution pattern, although these patterns may be similar. Whether we see a continuum, with each species in turn reaching a peak density at a particular elevation, the view of most current American ecological theory, or communities of species with similar physiological tolerances occurring together in a quadrat at a particular elevation, as in most current continental European ecology, depends largely on our point of view. Both points of view are valid and useful, provided that the dynamic aspects of communities are not

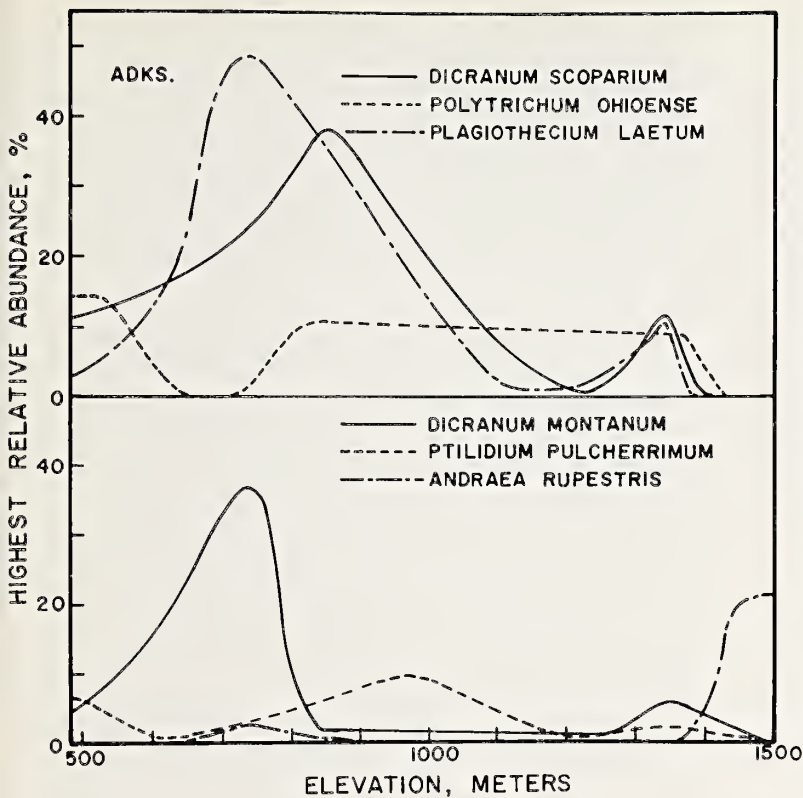
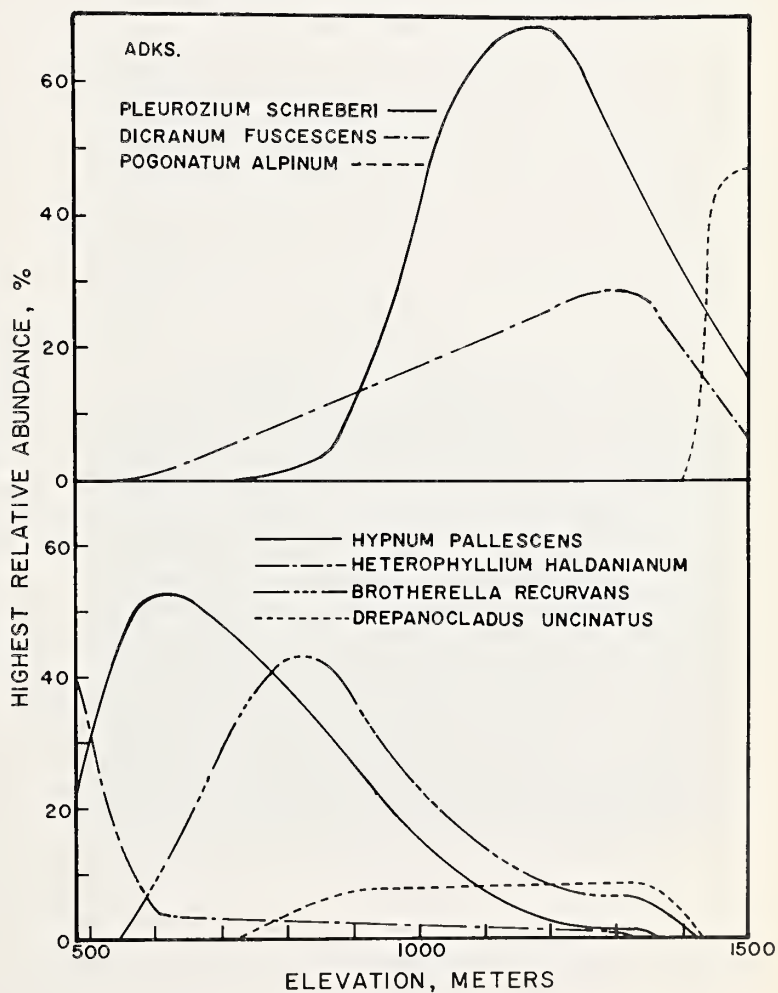


FIGURE 27 Generalized curves for abundance of the following bryophyte species in relation to elevation on Whiteface and Ampersand Mts.

Andreaea rupestris
Dicranum montanum
Dicranum scoparium
Plagiothecium laetum
Polytrichum ohioense
Ptilidium pulcherrimum

FIGURE 28 Generalized curves for abundance of the following bryophyte species in relation to elevation on Whiteface and Ampersand Mts.

Brotherella recurvans
Dicranum fuscescens
Drepanocladus uncinatus
Heterophyllum haldanianum
Hypnum pallescens
Pleurozium schereberi
Pogonatum alpinum





(photo by A. B. Wellborn)

Flag trees (*Abies balsamea*) below timberline, Whiteface Mountain, showing importance of prevailing wind direction.



(photo by D. M. Slack)

Whiteface Mountain in late December showing snow cover, spruce-fir and arctic-alpine zones.

obscured by overzealous classification. Phytosociological methods have sometimes been used by Americans working with bryophytes, as, for example, by Norris (1964) in his Adirondack study, and by various students of bryophytic epiphytes. As pointed out above, epiphyte systems are especially dynamic, although characteristic groupings of species (communities in the sense used here) were found on particular tree species in this study.

Although the comparison of communities and of species populations along an elevation gradient is termed by myself and others direct gradient analysis, it must be kept in mind that elevation is in reality a complex gradient. Organisms do not respond to changes in elevation per se, but to a variety of environmental factors that change concomitant with elevation change. There is a striking change in the vegetation on Whiteface Mountain at about 2500 ft (760 m) where deciduous forest is replaced by spruce-fir forest. This change occurs at somewhat different elevations on different slopes of Whiteface and at somewhat lower elevations on Ampersand. In this study, no sharp differences in environmental conditions were observed at these elevations, and even the large-scale study of environment and vegetation on Whiteface (Scott and Holway, 1969) has been unable to document microclimatic changes at the transition elevations. Different environmental factors, such as growing seasons, maximum and minimum temperatures, annual precipitation, date of spring snowmelt, etc., could all be measured and graphed as the individual species populations were; each one probably follows a different pattern. At some elevation the "community" of these factors is such that the growth of red spruce and balsam fir is favored over that of most deciduous trees. (*Betula alleghaniensis*, *B. papyrifera* var. *cordifolia* and *Pyrus americana* do grow in the spruce-fir zone.) Environmental variables, such as exposure and prevailing winds, change with the direction of slope; thus, the community of factors favoring spruce-fir vegetation may occur at somewhat different elevations on different slopes.

In a recent study of the Green Mountains of Vermont, which are quite similar to the Adirondacks, Sicama (1974) concluded that the boundary between deciduous and coniferous (spruce-fir) forest was climatically, not edaphically controlled. His measurements showed a vertical climatic discontinuity accounting for the change in forest type. The two most important factors appeared to be the number of frost-free days per year and the frequency of the cloud base. The latter increased at about 790 m, which resulted in increased fog drip and hoarfrost, favoring coniferous over deciduous forest. The mean number of frost-free days decreased from 142 at 732 m to 103 at 914 m in de-

ciduous and spruce-fir forest, respectively. With a larger number of stations to record microclimatic data, these or similar factors could probably be shown to be important on Whiteface Mountain in the transition zone. The extent to which the transition is sharp or gradual will depend on the extent to which the changes in each of the important microclimatic factors occur at similar elevations.

The change from spruce-fir to arctic-alpine vegetation passes through a krummholz stage with stunted trees on some slopes occurring below the summit. Changes in environmental factors are more evident above timberline. Such changes within the arctic-alpine zone have been measured and related to the vegetation on Mt. Washington, New Hampshire, by Bliss (1963, 1969). On Whiteface, the effect of slope angle on vegetation has been measured by Nicholson and Scott (1969), who found it to be a major determinant of the altitude of timberline, and also of the diversity of vascular vegetation. These findings were confirmed in my study, but other microclimatic and topographic factors such as available water and habitat instability caused by rockslides also affect diversity of both bryophytes and vascular plants.

Duration of snow cover is another important factor that has not been examined systematically in the Adirondacks. Certain vascular plants and also bryophytes, e.g., *Polytrichum sexangulare* (formerly *P. norvegicum*) are known to be characteristics of areas of persistent snow cover. Winter and spring snow cover varies with location on Adirondack summits. I have been on the 5,000-foot summit of another Adirondack high peak, Mt. Algonquin, in March and observed sizable areas of arctic-alpine vegetation without any snow cover. On the other hand, on June 1, at least in some years, the 4400 ft (1340 m) quadrats are still under several feet of snow. The summit area of Whiteface, exposed to wind and high daytime insolation, was free of snow at that date. The high diversity found at 1340 m and the particularly high number of liverwort species are probably a result of increased moisture from the late snowmelt, and to the advantage of bryophytes over herbaceous vascular plants when the growing season is shortened by persistent snow cover. Bryophytes, unlike most vascular plants, can photosynthesize virtually as soon as uncovered; there is even evidence of photosynthesis of bryophytes under snow (Rastorfer, 1970; Longton, 1974). Photosynthesis at subzero (0°C) temperatures in the arctic has been recorded (Wilson, 1957) and may occur at these temperatures on Whiteface Mountain also. On the other hand, *Oxalis montana* comprised 84 percent of the total vascular ground flora at 1220 m, but is reduced to 22 percent in the quadrats with high bryophyte diversity at 1340 m.

At Kenrose Preserve the much shorter elevation range also proved important in terms of species diversity. In fact, elevation is the factor most highly correlated ($r = 0.69$) with bryophyte diversity (H'). Attempts to discover which aspects of elevation are important, that is, what actually happens to the bryophyte environment over the 130 m elevation gradient, were partially successful. Degrees of slope ($r = 0.46$) and pH ($r = 0.48$) were both significantly correlated with elevation and highly correlated with each other ($r = 0.79$). They are also each correlated with diversity (H'): $r = 0.60$ for degrees of slope and 0.45 for pH. Thus, elevation range at Kenrose is a complex factor including degrees of slope, pH, and probably differences in drainage as well, some combination of which are important for bryophyte diversity.

Bryophyte Diversity and Community Diversity

G. Evelyn Hutchinson's paper, 1959, "Homage to Santa Rosalia, or Why Are There So Many Kinds of Animals" was one of several that spurred the current interest in species diversity. The great majority of the research on diversity has involved animals or planktonic organisms in spite of the following, perhaps overlooked, statement in Hutchinson's paper:

Extraordinary diversity of the terrestrial fauna. . . is clearly due largely to the diversity provided by terrestrial plants.

He assumed that the three-fourths of a million insect species are in part a product of the diversity of terrestrial plant species and posed the really relevant question: "Why are there so many kinds of plants?"

Is the diversity of one segment of a community indicative of the overall diversity of the community, as suggested by Margalef (1963) and Johnson and Raven (1970)? This question can be asked regarding the various strata or taxonomic groups of the plant community.

My data suggest that one cannot obtain an index to the overall diversity of the plant community by sampling one segment. High bryophyte diversity is not correlated with high diversity of vascular plants whether H' or S is used as an index. Each stratum showed a different pattern of diversity with elevation in the Adirondacks. No correlation between diversity of vascular ground flora and that of bryophytes existed; shrub diversity showed an inverse correlation with that of bryophytes. The only direct correlation, in fact, was between diversity (H') of bryophytes and the number of tree species at Kenrose Preserve ($c = 0.58$). Even this relationship was not found elsewhere; that diversity of bryophytes is highest in the Adirondacks under

pure stands of balsam fir. In the arctic-alpine quadrats, the diversity of bryophytes is low, but that of another taxonomic group, the lichens, is high. Among vascular plants at that elevation, the shrub component of the communities has relatively high diversity, but the herbaceous vascular plant segment does not.

A closer relationship between the diversity of one segment of a community with another may exist when the segments have direct predatory-prey relationships, either between consumers, or between herbivore and host plant. High plant and high insect diversity are both found in the tropics, for example. MacArthur and MacArthur (1961) found that bird species diversity was more closely related to structural aspects of the vegetation than to the number of plant species present. Foliage height diversity (FHD) was the aspect of vegetation structure used, and this or similar measures of vegetation structure have since been found to be determinants of bird, lizards, and rodent diversity in other studies (MacArthur, Recher, and Cody, 1964; Pianka, 1966; Rosenzweig and Winakur, 1969). Tomoff (1974) found that FHD does not predict the number of bird species in desert scrub, but that a physiognomic coverage diversity based in part on the life forms of plants was a good predictor. Tomoff also found nest site specificity for desert birds in relation to plant species. Some other recent studies (Karr and Roth, 1971, Kricher, 1972, Cody, 1974) have discussed bird diversity in terms of vegetative structure, including beta (between-habitat) diversity of vegetation. The within-habitat studies have largely been of forest birds, usually secondary consumers and therefore not directly related in their food habits to specific plants. Prairie studies include herbivorous birds, but even these are rarely restricted to a particular species of plant. Studies of tropical fruit-eating birds might show closer bird and plant species diversity.

From an evolutionary point of view, there is no question that birds of one family can evolve in relation to plant species available, at least in the absence of competition from birds of other taxonomic groups. The niches of almost all the Galápagos finches (Lack, 1947) can ultimately be related to plant species on the islands.

The relationships between diversity of the insect and angiosperm sectors of the community can also be examined from an evolutionary viewpoint. The whole Cretaceous period was probably a time of extensive angiosperm and insect coevolution. Ehrlich and Raven (1964) cite coevolution of Papilionoidea (butterflies) and dicotyledons. Other examples of specific plant-insect coevolution, a subject initiated by Darwin, have been more recently given by Brower (1958) and Janzen (1969, 1970). Ehrlich and Raven (1964) conclude that the converse of Hutchinson's (1959) assumption may be true: phytophagous insects augment the diversity of

plants! Janzen (1970) supports a similar view in regard to seed-eating insects and tropical tree diversity. Two recent papers have discussed the relation between plant and insect diversity. Sharp, et al. (1974) found little relationship between butterfly and plant diversity in subalpine areas, but Murdoch, et al. (1972) working with Homoptera in fields, found high plant-insect correlation for both H' and J' . The butterflies were not as closely tied to particular plants as the Homoptera, some of which are host specific. Such specificity should increase the importance of plant diversity in relation to that of insects.

Bryophytes have few close ties with animals, apart from the species of the family Splachnaceae that live on dung, and whose spores are carried by Diptera. Several of these occur in the Adirondacks, though I have only found *Splachnum rubrum*; Splachnaceae are a more important part of bryophyte communities in the Arctic. Few herbivores eat bryophytes, although some animal unknown to me eats moss sporophytes, particularly those of *Polytrichum*, even on the summit of Whiteface. Tardigrades live on and apparently feed on bryophytes, and I have seen a variety of rotifers associated with bryophytes I have collected, but no one has yet made a diversity study of either of these groups of microscopic animals or their relation to bryophyte species.

Within the various sectors of the plant community, relationships are not as specific as between most bird or insect and plant species. Parasitic and semiparasitic plants (including angiosperms) are exceptions, as are those plants which produce chemicals inhibiting the growth of other plants. In this study a few species of epiphytic bryophytes were specific to their host trees, at least within the area studied. Higher epiphyte diversity was present on Ampersand Mountain in the mixed deciduous forest with many tree species than in the spruce-fir forest with fewer tree species. A pure beech or hemlock forest would have fewer epiphytic bryophyte species than a mixed hardwood-hemlock forest at the same elevation. Relationships between plant species in different strata are, in most cases, much less specific, usually involving environmental factors. The particular bryophytes found only in the oak-hickory forest at Kenrose Preserve are probably there in response to the same factors (low humidity? drier soil?) that favor the growth of these trees over maple or beech; the bryophytes are not there because of the particular tree species.

Especially harsh conditions, such as at the summit of Whiteface, may affect bryophytes and vascular plants similarly, resulting in a community consisting of species with similar tolerances in both of these strata. Species diversity is low in both these strata; relatively few species of either group are tolerant of summit conditions.

Species diversity relationships between segments of the plant community can also be looked at from an evolutionary viewpoint. The great majority of bryophytes in a temperate or tropical forest region are dependent on vascular plants for many aspects of their niches. Some bryophytes are obligate epiphytes on living trees; some liverworts are obligate epixyls on rotten logs (Barkman, 1958). In the tropics, in southern United States (Guerke, 1973) and even in the Pacific Northwest (Vitt, et al., 1973), some bryophytes are epiphyllic, that is, are epiphytes on living leaves, largely on evergreen angiosperms (or conifers in the north). In Puerto Rico, I have observed liverworts growing on ferns and aroids.

Even those forest bryophytes that are not so directly dependent on vascular plants as substrates are usually dependent on the shade and humidity provided by these plants. Although bryophytes are an ancient group and are not noted in general for rapid evolution, "explosive" evolution in some genera with many species is probably a relatively recent phenomenon. As such it is dependent on relationships with the vascular plant strata. I quote Schuster (1966) on this subject, with particular reference to liverworts:

... any explosive evolution in the Bryophyta came about only *after* evolution of a polytypic, complex, and rather complete cover of such groups as Pteridospermae, conifers, tree ferns, and Angiospermae, which, together with a rich ground and shrub flora (of ferns, lycopods, etc.), served to maintain humidity and reduce insolation. *Only after this* were conditions on land created that favored speciation in the Hepaticae. Indeed, I would go so far as to say that *today* conditions of so much greater diversity exist (compare tropical montane rain forests . . . and . . . cool subarctic rain forests . . .) than prior to the Mesozoic, so that extensive present-day microevolution (i.e., speciation) of Hepaticae and Musci is much more likely on a large scale than in most prior periods of their existence. [Italics Schuster's.]

Schuster goes on to give examples of recent "explosive" speciation in such families as Plagiochilaceae and points out that the majority of these species are arboreal and that their evolution "must postdate that of the dense, humid forests in which they have evolved most copiously." Thus, in the tropics and even in a temperate forest, there exists a very important relationship between the bryophyte diversity and that of vascular plants, in terms of bryo-communities. It is interesting to note that bryophytes have evolved to fill quite different niches provided by vascular plants, niches in which neither shade nor high humidity is present. In this study, species of *Frullania* were found on tree trunks in highly xerophytic conditions, i.e., in

open niches available to no other groups of plants except, perhaps, some lichen species. Evolution of special water-holding structures may have made the occupation of such niches by *Frullania* possible.

Two conclusions can be reached from the above discussion. First, one cannot assume that, by measuring the diversity of one segment of a community, whether birds, vascular plants, bryophytes, etc., the diversity of the community as a whole, or even of the plant or animal portion of it can be predicted. Significant correlations may exist, but more often they do not. Secondly, one segment of a community may be related, at least in an evolutionary sense, to the diversity of another or of several other segments. Present diversity relationships are complicated by other factors, such as competition both between and within segments of each trophic layer of a community.

Dominance-Diversity Curves and the Division of Niche Space

Dominance relationships among members of a community or one stratum of a community can be studied in several different ways. One method is by the calculation and comparison of evenness or "J" values. These have already been presented and compared, and are discussed further in the following section. Another method consists of plotting dominance diversity curves, as Whittaker (1965, 1970) has done for plant communities of the Great Smoky Mountains and elsewhere. These two methods have been used with my data, separately and in combination.

I have plotted dominance-diversity curves for bryophytes in the quadrats studied at Whiteface and at Kenrose Preserve, using relative cover values to rank the species in order of dominance. Whittaker's curves are plotted for vascular plants and are based on net annual production, although he has also used cover values and has stated (1965) that curves of similar form resulted for both types of values. The species are arranged (figs. 29 and 30) in order of their decreasing cover values, from highest to lowest cover value on the abscissa. The curve origins are spaced out for clarity; for example, the five species of the first Kenrose quadrat run from 1 to 5, but the 25 species of the last quadrat run from 25 to 49 (fig. 29). Relative cover value (or "abundance") is on a log scale.

Several different forms of curves result, some of them similar to those of Whittaker. In my quadrats of low diversity (low H' and low S) as in low diversity communities of Whittaker, straight lines of steep slope result. Whittaker pointed out that this type of curve approximates a geometric series. Translated into niche theory, such a series may be used as a model in which a dominant species preempts a certain percentage of

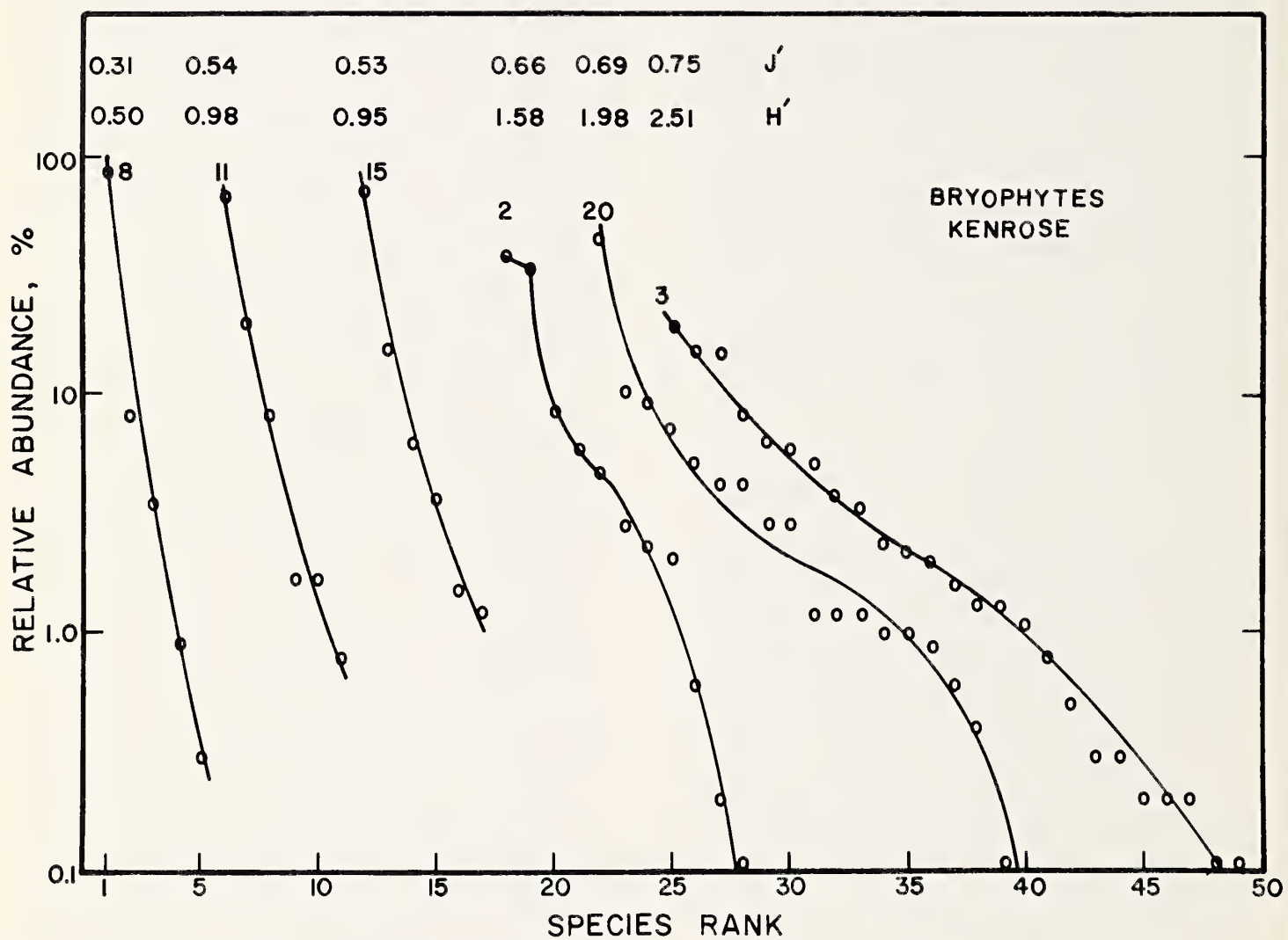


FIGURE 29 Dominance-diversity curves and J' and H' values for six quadrats at Kenrose Preserve (Nos. 8, 11, 15, 2, 20, and 3).

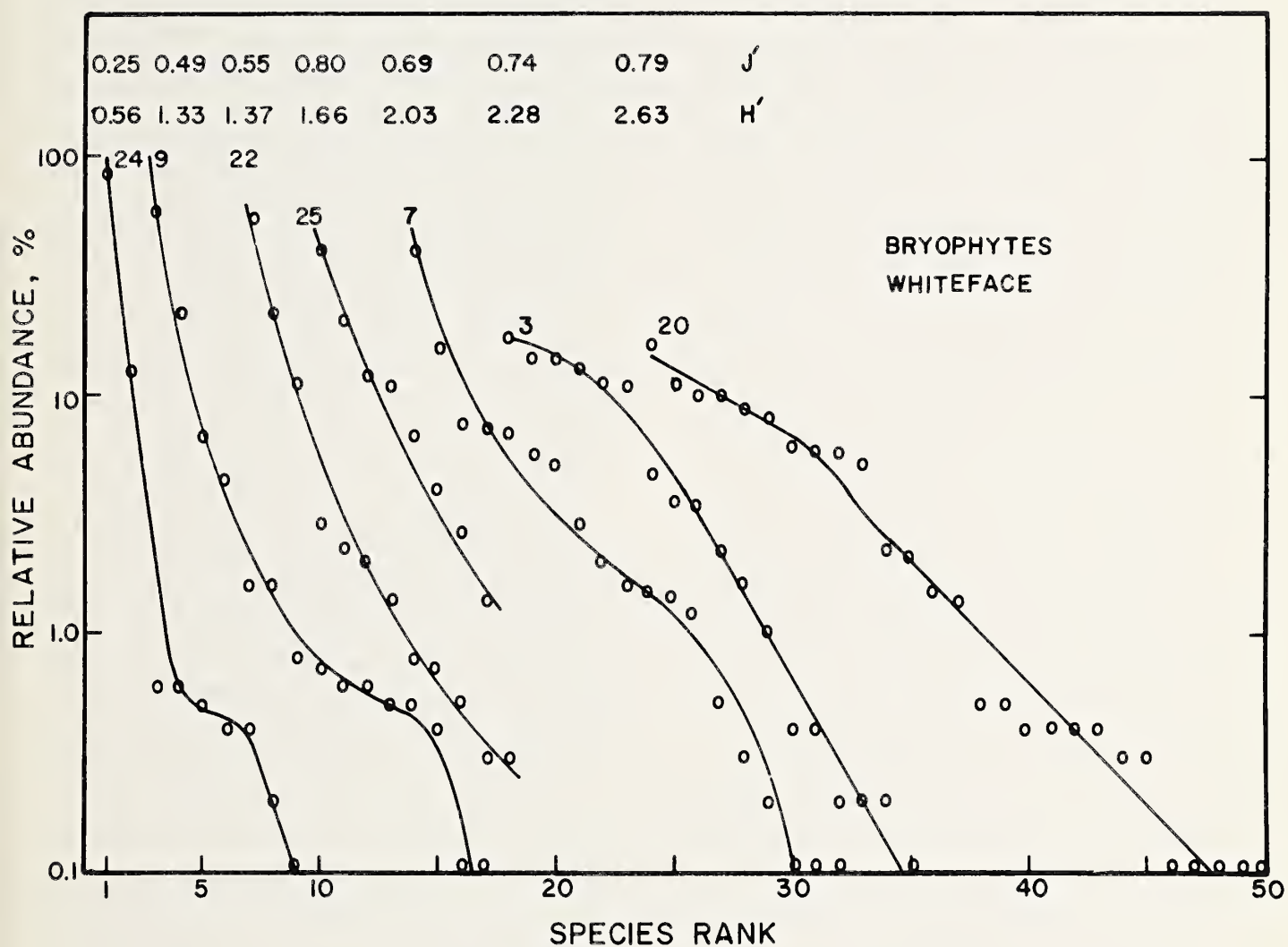


FIGURE 30 Dominance-diversity curves and J' and H' values for seven quadrats at Whiteface Mt. (Nos. 24, 9, 22, 25, 7, 3, and 20).

available niche space, c , approximated here by its percent cover, as follows:

The second ranked species occupies the same percentage of the remaining cover, $1-c$, generating the equation:

$$y = C(1-c)^{x-1}c$$

where y is the fraction of cover representing niche space for all species, C is total cover, and x is the species' rank.

None of the bryophyte curves shows a constant or nearly constant c , nor do those presented by Whittaker (1965, fig. 3). There is no particular reason to believe that each species should utilize the same proportion of niche space. Among the low diversity quadrats (8, 11, and 15 at Kenrose, and 24 and 25, both summit quadrats at Whiteface), considerable differences in division of niche space exist to an extent that this is actually reflected in dominance relationships. In quadrat 8 at Kenrose and 24 at Whiteface, one species has usurped the greatest extent of total bryophyte niche space, over 90 percent in quadrat 8. In these two quadrats either two or three species occupy over 99 percent of the niche space, resulting in very steep curves for this portion. Whiteface quadrats 24 and 9 (which has a large number of species but also a steep upper curve) have a relatively large number of species of low cover value. This pattern of dominance and diversity results in a sigmoid type of curve (fig. 30) not found among Whittaker's. Whittaker has omitted from his curves species of very low productivity, which may account for his steep lower curves, but it is also quite likely that bryophytes are able to divide remaining niche space more finely than can vascular plants.

I pointed out earlier that different dominance relationships are present even in low diversity quadrats in the same area, even when they have the same number of species as in quadrats 24 and 25 on the summit of Whiteface. The dominance-diversity curves for these quadrats (fig. 3) show these differences very strikingly. In 25, the initial curve is less steep with abundances of bryophyte species more evenly distributed than in 24, and there are no rare species. Different possibilities exist for the division of bryophyte niche space even under similar rigorous conditions.

Sigmoid curves similar to Whittaker's is, at least over the upper and middle portions, also resulted from my data. In terms of niche allocation, such curves (2 and 20, Kenrose, fig. 29, and 7, Whiteface, fig. 30) represent communities with more competing species, no one species usurping an especially large portion of niche space and with a large "middle class" utilizing similar portions of the niche space. In quadrat 2, Kenrose, there are two codominant species, a distribution also found by Whittaker.

Whittaker's communities of highest species diversity form similar sigmoid curves but of smaller slope. He used Preston's "lognormal" distribution as a model for these communities. This distribution consists of many species of intermediate abundance with fewer of greater and lesser abundance, approximating a normal curve when abundances are plotted on a log scale. The most diverse quadrats in my study area, represented here by 3, Kenrose (fig. 29) and 3 and 20, Whiteface (fig. 30) do not fit Preston's model. Preston's curve would be truncated at the upper end since no species in any of my high diversity quadrats has a relative abundance as high as 20 percent. The lower end of the curve would also differ because of the large number of bryophyte species of low relative abundance in these quadrats. These species can be seen on the dominance-diversity curves, which lack the steep drop at the end in contrast to Whittaker's curves for the high diversity communities in his studies.

As Whittaker himself noted (1965), there is no good reason to expect different strata of a community "subject to different environmental factors and modes of population limitation" to show parallel dominance-diversity relationships. When a plant community is extended to include the too often ignored bryophytes, differences in basic biology could be important. For example, Whittaker suggested that the lower portions of dominance-diversity curves may be affected by only partially adequate seed dispersal into the potential rare niche, leaving suitable niches empty, and presumably resulting in a steep lower curve. Bryophyte spore dispersal appears to me to be more successful in filling these niches. The ability of appropriate bryophytes to arrive at "rare" niches is often very striking, even when these niches are manmade. *Bryoerythrophyllum recurvirostrum* and *Encalypta procera* occur on a cement wall near the summit of Whiteface but were found nowhere else on the mountain (Reilly, 1964). Other species, such as *Tetraphis pellucida*, are nearly always found where their appropriate niches occur. This is true to such an extent that I am always surprised not to find *Tetraphis* on rotting conifer stumps of the appropriate stage of decay when I am out of the range of this species.

Furthermore, various types of open niches may each be filled by a number of different species of rare bryophytes, and this sort of opportunism, to be discussed below, probably also fills in the lower end of the dominance-diversity curve. Fitting any of these curves to mathematical models of niche space division may be premature. We know little about their multi-dimensional niche spaces, or their competitive relationships. Forman's (1964) experimental study of the physiological ecology of *Tetraphis pellucida* is probably the closest approach to elucidating the fundamental niche in Hutchinson's (1957) sense for any bryophyte

species. Other recent studies, though not experimental, have succeeded in measuring or identifying niche factors for bryophytes in particular habitats, for example, *Sphagnum* species in bogs (Vitt and Slack, 1975) and bryophytes on rotting logs (Mühle and LeBlanc, 1975). More such studies are needed before ecological theories of the division of niche space can be fully extended to bryophytes.

Finally, the shapes and slopes of dominance-diversity curves can be related to evenness (J') values as calculated from the Shannon function. These values, as well as those of H' are shown for each quadrat plotted in figures 29 and 30. For example, compare quadrat 3 at Whiteface with quadrats 7, Whiteface, and 20, Kenrose. All of these quadrats contain one or two dominant species and have the same evenness value ($J = 0.69$). Quadrat 3 with six nearly equally dominant species at the top of the curve and therefore a higher evenness value (0.79), also has considerably higher diversity ($H' = 2.28$ as compared to 2.03 and 1.98 for the other two quadrats).

Although Whittaker stated that diversity is largely determined by the number of species in the middle portion of these curves, he was referring to diversity in terms of species richness (S). When highest diversity measured as H' is considered, it is obvious from the curves that H' is greatest when the species are evenly distributed throughout the curve; that is, over the upper as well as the middle portion. Such distribution results, of course, in the highest J' values. This pattern, and the resulting dominance-diversity curve, is an unusual one for bryophytes, at least in the forest habitats I have studied. High J' values were exceptional in this study; almost all were very low compared with Tramer's (1969) for birds or Pielou's (1966a, b) for herbaceous plants and shrubs.

Opportunism Among Bryophytes

Tramer (1969) has suggested that some groups of organisms tend to be "equilibrium" groups and to have their diversity (H') regulated largely by variation in species richness (S), while other groups are "opportunistic" and are more likely to have their species diversity regulated by variation in relative abundance or evenness (J'). Thus territorial birds living in stable, nonrigorous environments and having relatively stable population densities over time may be thought of as equilibrium species. Plankton, at the other extreme, live in unpredictable environments and a species' number may increase rapidly, but temporarily, when conditions are favorable.

All species in one group need not be entirely opportunistic or entirely equilibrium species; the Cape May warbler, a territorial bird, may be considered opportunistic because its population increases in response to the periodic abundance of spruce budworms. MacArthur (1960) defined the terms "opportunistic" and "equilibrium" and pointed out that photosynthetic organisms, including diatoms and early successional vascular plants, could also be placed in the opportunistic category.

According to Tramer (1969), groups of organisms with low and variable J' values can be considered opportunistic. He found high J' values (from 0.84 to 0.92), except for gregarious marsh birds. In addition, the J' values were stable; increased diversity (H') in his bird communities is closely correlated with increase in species richness (S). Thus, by his criteria, the species in these bird communities are not opportunistic. Sager and Hasler (1969), on the other hand, found lower J' values in their phytoplankton studies. Diversity (H') could not be predicted from species richness alone; the J' values were not stable. Therefore, according to Tramer's criteria, these phytoplankton species could be considered opportunistic, as MacArthur earlier suggested for diatoms.

By the same criteria, bryophytes, at least in certain habitats, can also be considered opportunistic. The J' values in my studies were low, as pointed out above, and also variable, at least in the Adirondacks. Out of all the quadrats studied, 29 percent had J' value under 0.6, 46 percent under 0.7, and 89 percent under 0.8. Most of the values ranged between 0.5 and 0.8, but values as low as 0.25 were found under rigorous summit conditions, as would have been predicted by Tramer. For bryophytes at Kenrose Preserve, entirely within deciduous forest biome, there was also great variation in J' , with values as low as 0.3. The majority of values are between 0.5 and 0.75, lower than those found by Pielou (1966a, b) for the herbaceous-shrub community in a Quebec study. Although species diversity (H') and species richness (S) are correlated for Kenrose bryophytes, there is great scatter of J' values at lower species numbers, indicating that even in deciduous forest in the more rigorous habitats (see Kenrose discussion) with low species richness, H' is not predictable from S . In the Adirondack study areas, J' is highly variable even in higher diversity quadrats; therefore, H' is not predictable from S even in these quadrats. In the summit quadrats on Whiteface, as pointed out above, quadrats with the same number of species sometimes have very different J' values.

Rigorous or unstable environments, e.g., the summit quadrats at Whiteface and the low elevation, seasonally mud-covered quadrats at Kenrose, are notable in these studies for low species richness and for low, though variable J' values as well. Some of the bryophytes species living in these environments prob-

ably are opportunistic in that they can persist and reproduce effectively in rapidly changing environments. Some are able to reestablish populations quickly after a landslide or mudflow. I do not mean to imply that all or most bryophyte species are opportunistic; most forest bryophytes probably are not. Other groups of organisms that consist largely of equilibrium species often contain some species or groups of species that are opportunistic in changing environments, such as the Cape May warbler (MacArthur, 1960), cited above, or black cherry (*Prunus serotina*) in disturbed oak forests in Wisconsin (Auclair and Cottam, 1971). For black cherry, the authors cited widespread dispersal, delayed seed germination, and flexible seedbed requirements as "opportunistic characteristics." Adaptation for successful establishment under nonequilibrium conditions seems to be as important as high reproductive rate for opportunistic species, at least among plants.

There is evidence besides that of J' or evenness values that some bryophytes are opportunistic, at least in certain environments. Schofield (1971), discussing bryophytes in the Arctic, wrote that "mosses are opportunistic in the high water table conditions, various taxa invading the shaded sites. . . yet others succeeding in the open well-illuminated areas." He also pointed out a number of species that were able to invade unoccupied sites such as rocks in streams and bare silt, and cited a study of Whitmire (1965) on the early establishment of opportunistic species on dung, followed, as pH becomes more like that of the surrounding bog, by common bog species, perhaps the equilibrium species of this environment. Other arctic bryophytes, e.g., *Bryum wrightii* (Steere and Murray, 1974), also appear to be opportunists, appearing in such disturbed habitats as lemming runways.

Crum (1966) stated that "open disturbed situations are usually quickly occupied by species of broad ecological tolerances and short life cycles or both," although he does not believe disturbed sites to be suitable to the majority of mosses. Many mosses, such as *Pleurozium schreberi* in balsam fir forest in the Adirondacks, appear to be occupants of stable sites and represent the "equilibrium species" among bryophytes.

Schuster (1966) described the exploitation by bryophytes, and especially by liverworts, of sites in the tropics not occupied by other plants, such as the surfaces of living leaves and twigs (also of interest in connection with the high species diversity of tropical liverworts). The exploitation of the twig habitat is also illustrated by Herzog (in Gams, 1932) with a photograph of a small twig of *Berberis* in Bolivia bearing five different bryophyte species. The epiphyllous habitat also is a short-lived, unstable one. Although the leaves are usually evergreen and persist long enough for the

bryophyte to reproduce, sexually or asexually, the population perishes when the leaf falls. Propagules are easily and quickly dispersed to other leaves, as is characteristic of opportunistic species.

Outside the tropics, many liverworts are equally limited to temporary or extreme habitats such as decaying logs or snowfield margins, or, as in this study, the bark of trees. Schuster (1966) considered liverworts, and perhaps bryophytes as a group, to a large extent opportunistic; "the less mature and more extreme [the environment] the more diverse and conspicuous the bryophyte flora." He also cited some rare experimental evidence: Griggs (1934, 1935) found two liverwort species (both of Adirondack genera) that could grow and reproduce on nitrogen-free volcanic ash where other plants could not. When nitrogen was added, algae and moss protomema crowded the liverworts out. Opportunism and lack of competitive ability under conditions of higher productivity and stability appear to be correlated for certain species. This correlation may be found in liverworts as a group more often than in mosses, though it is not characteristic of all liverworts, e.g., *Bazzania trilobata*, in the Adirondacks.

Another somewhat different type of opportunism has to do with stochastic or chance factors and is related to the last question I want to consider here: the relationship for bryophytes of species diversity, niche space, and the Gaussian principle. Schuster discussed elsewhere (1957) the composition of pioneer bryophyte communities growing as epiphytes on *Thuja*, and in another example, on decorticated logs. On *Thuja* he found 11 different combinations of liverwort species alone. He stated that these species were all ecologically very similar and concluded that the most important factor in the determination of groupings was chance; that is, which species happened to arrive first. In the decorticated log habitat, he found a total of 25 ecologically similar "candidates" for invasion of this environment. He concluded that "environment plus chance plus time governed what species shall undergo ecesis [successful establishment] . . . If a species has a slight advantage in time . . . it tends to form large, pure patches, due to extraordinary high reproductive potential." The latter is due largely to asexual reproductive structures, another frequent characteristic of opportunistic plant species.

Schuster, also noted the occurrence on some of these logs of a great number of ecologically similar species that "undergo ecesis on the same site at the same time." The heterogeneous community formed "results from gregariousness of sociability of many species of Hepaticae (and mosses)." This same gregariousness, the presence of many different species occupying one small area of apparently uniform environment, has been noted by many bryologists. Steere (1951) noted it on Cornwallis Island in the Arctic.



Bryophyte community of a rotten log, hemlock-hardwood forest, Ampersand Mountain, containing 15 or more species.



(photo by N. G. Slack)

Diverse bryophyte community overhanging rock face, Whiteface Mountain.

Schofield (1971) wrote that "the apparent lack of competition among a diversity of taxa of bryophytes in a small area is shown by the universal occurrence of this phenomenon in the arctic." It is also a common phenomenon in the deciduous and spruce-fir forests I have studied, particularly on logs, both decorticated and in earlier stages of decay. I have frequently found as many as fifteen species of bryophytes on one log, with little apparent differentiation of microhabitat for the majority of them, though a few are characteristic of damper undersides.

Do Gaussian principles of "competitive exclusion" really hold for bryophytes in such habitats? In many habitats the bryophytes found in such assemblages belong to the same genera, *Mnium*, *Brachythecium*, and *Hypnum*, for example, on logs in early stages of decay, and *Cephalozia* on decorticated logs. Must we believe Slobodkin (1961) that the "portions of the fundamental niches of two [ten?] species. . . that are found to coexist are not identical"? Or, "if they seem to be identical the study is incomplete"? Perhaps we can use Slobodkin's phrase "persist indefinitely" to wriggle out of this dilemma. These apparently coexisting species obviously do not persist indefinitely; their habitats are temporary. When the log decays completely, as when the leaf with its epiphyllous bryophytes falls, the species coexist no longer. These are in a sense fugitive species (Hutchinson, 1965) which when displaced, in this case not by a competitor but by the disappearance of their habitat, are mobile enough in terms of sexual or vegetative propagules to establish themselves on new open sites (e.g., another newly fallen log in the Adirondack forest). Hutchinson pointed out that a similar idea has been advanced by Skellam for annual plants, which must find a new site each year. Perhaps they, too, thus avoid the problems of competitive exclusion.

Even with a long-persistent rotting log, there is another way of avoiding Gaussian fate, suggested both by Hutchinson (1964) and by Levin (1970). In Hutchinson's terms, "If two species were almost equally efficient over a wide range of environmental variables, competitive exclusion would be a slow process." It seems to me that with nearly equal efficiency in the rotten log habitat, exclusion could be slow enough even without the random environment suggested by these authors.

In conclusion, I believe that the solution to this problem of coexistence of closely related species of bryophytes is very important to the understanding of bryophyte diversity and its importance in a plant community. Bryophyte diversity, where measured as S or H' (or very likely by any other method) increases as the number of suitable bryophyte habitats increases, whether this increase consists of spatial heterogeneity in terms of logs, rocks, etc., within one quadrat, or

consists of a large elevation range with resulting vegetation types. Furthermore, diversity is increased where a large variety of bryophytes apparently coexist in any one such suitable habitat, whether it is a moss (and liverwort) covered log in the Adirondack spruce-fir zone, or an epiphytic site in a montane tropical rain forest. It is surely true that "the study is incomplete" and we may yet find differences between realized niches of all the apparently coexisting bryophytes. We may as likely find that bryophytes are in large part opportunistic species, and that their primary role and in their contribution to the species diversity of plant communities is in their coexistence, not indefinitely but persistently, in ultimately temporary habitats, and in their ability to exploit a variety of habitats not suitable to other sectors of the plant community.

These intensive studies of bryophyte ecology in New York State forests have identified some problems of bryophyte species diversity and community structure, and have provided data for some tentative answers. Many more studies are needed of bryophytes in forest habitats of other regions, and in other types of habitats before we can gain a better understanding of these problems.

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APPENDIX A

Bryophytes Found in Adirondack Quadrats (Whiteface and Ampersand Mts.)

Mosses

Amblystegium juratzkanum Schimp.
Amblystegium serpens (Hedw.) B.S.G.
Amblystegium varium (Hedw.) Lindb.
Andreaea rupestris Hedw.
Anomodon rugellii (C. Müll.) Keissl.
Atrichum angustatum (Brid.) B.S.G.
Atrichum undulatum (Hedw.) P. Beauv.
Brachythecium acuminatum (Hedw.) Aust.
Brachythecium curtum (Lindb.) Limpr.
Brachythecium oxycladon (Brid.) Jaeg. and Sauerb.
Brachythecium populeum (Hedw.) B.S.G.
Brachythecium reflexum (Starke ex Web. and Mohr.)
 B.S.G.
Brachythecium rutabulum (Hedw.) B.S.G.
Brachythecium salebrosum (Web. and Mohr.) B.S.G.
Brachythecium velutinum (Hedw.) B.S.G.
Brotherella recurvans (Michx.) Fleisch.
Bryum capillare Hedw.
Callicladium haldanianum (Grev.) Crum
Campylium chrysophyllum (Brid.) J. Lange
Campylium hispidulum (Brid.) Mitt.
Dicranella heteromalla (Hedw.) Schimp.
Dicranum flagellare Hedw.
Dicranum fulvum Hook.
Dicranum fuscescens Turn.
Dicranum montanum Hedw.
Dicranum polysetum Sw.
Dicranum scoparium Hedw.
Dicranum undulatum Brid.
Dicranum viride (Sull. and Lesq. ex Sull.) Lindb.
Drepanocladus uncinatus (Hedw.) Warnst.
Encalypta procera Bruch.
Eurhynchium pulchellum (Hedw.) Jenn.
Fissidens osmundoides Hedw.
Grimmia affinis Hornsch.
Grimmia apocarpa Hedw.
Grimmia donniana Smith
Hedwigia ciliata (Hedw.)
Herzogiella striatella (Brid.) Iwats.
Herzogiella turfacea (Lindb.) Iwats.
Hylocomium splendens (Hedw.) B.S.G.
Hypnum imponens Hedw.
Hypnum lindbergii Mitt.
Hypnum pallescens (Hedw.) P. Beauv.
Isopterygium distichaceum (Mitt.) Jaeg. and Sauerb.
Leucobryum glaucum (Hedw.) Angstr. ex Fr.
Mnium ciliare (C. Muell.) Schimp.
Mnium hymenophyloides Heub.
Mnium punctatum Hedw.
Mnium spinulosum B.S.G.

Neckera pennata Hedw.
Oncophorus wahlenbergii Brid.
Paraleucobryum longifolium (Hedw.) Loeske
Plagiothecium denticulatum Hedw. B.S.G.
Plagiothecium laetum B.S.G.
Platydictya subtile (Hedw.) Crum
Platygytium repens (Brid.) Mitt.
Pleurozium schreberi (Brid.) Mitt.
Pogonatum alpinum (Hedw.) Roehl.
Pogonatum dentatum (Brid.) Brid.
Pohlia elongata Hedw.
Pohlia nutans (Hedw.) Lindb.
Polytrichum juniperinum Hedw.
Polytrichum ohioense Ren. and Card.
Polytrichum piliferum Hedw.
Polytrichum strictum Brid.
Ptilium crista-castrensis (Hedw.) De Not.
Racomitrium fasciculare (Hedw.) Brid.
Racomitrium heterostichum (Hedw.) v. sudeticum
 (Funck) Dix. ex Bauer
Rhodobryum roseum (Hedw.) Limpr.
Rhynchostegium serrulatum (Hedw.) Jaeg. and Sauerb.
Sphagnum capillaceum (Weiss.) Schrank
Sphagnum girgensohnii Russ.
Sphagnum quinquefarium (Lindb. ex Braighw.)
 Warnst.
Taxiphyllum deplanatum (Bruch and Schimp. ex Sull.)
Tetraphis pellucida Hedw.
Thuidium delicatulum (Hedw.) B.S.G.
Thuidium recognitum (Hedw.) Lindb.
Tortella humilis Hedw. Jenn.
Tortella tortuosa (Hedw.) Limpr.
Ulota crispa (Hedw.) Brid.
Ulota hutchinsiae (Sm.) Hamm.
Ulota coarctata (P.-Beauv.) Hamm.

Liverworts

Anastrophyllum michauxii (Huds.) Buch
Anastrophyllum minutum (Cr.) Schuster
Barbilophozia barbata (Schmid.) Dumort.
Bazzania trilobata (L.) Gray
Blepharostoma trichophyllum (L.) Dumort.
Calopogeia fissa (L.) Raddi
Calopogeia muelleriana (Schiffn.) K. Muller
Cephalozia bicuspidata (L.) Dumort.
Cephalozia laciniata (Jack) Spruce
Cephalozia media Lindb.
Cephaloziella hampiana (Nees) Schiffn.

Frullania asagrayana Mont.
Frullania eboracensis Gottsche
Gymnocolea inflata (Huds.) Dumort.
Jamesoniella autumnalis (D.C.) Steph.
Lepidozia reptans (L.) Dumort.
Lophocolea heterophylla (Schrod.) Dumort.
Lophozia attenuata (Mart.) Dumort.
Lophozia ventricosa (Dicks.) Dumort.
Marsupella emarginata (Ehr.) Dumort.
Mylia taylori (Hook.) Gray
Nowellia curvifolia (Dicks.) Mitt.
Pellia epiphylla (L.) Corda
Ptilidium ciliare (L.) Nees
Ptilidium pulcherrimum (Web.) Hampe
Radula complanata Dumort.
Radula obconica Sull.
Scapania nemorosa (L.) Dumort.
Tritomaria exectiformis (Breidl.) Schiffn.

APPENDIX B

Bryophytes Found in Quadrats at Kenrose

Preserve

Mosses

Amblystegium serpens (Hedw.) B.S.G.
Amblystegium varium (Hedw.) B.S.G.
Anomodon attenuatus (Hedw.) Hueb.
Atrichum undulatum (Hedw.) P.-Beauv.
Brachythecium acuminatum (Hedw.) Aust.
Brachythecium oxycladon (Brid.) Jaeg. and Sauerb.
Brachythecium populeum (Hedw.) B.S.G.
Brachythecium reflexum (Starke ex Web. and Mohr.)
 B.S.G.
Brachythecium salebrosum (Web. and Mohr.) B.S.G.
Brachythecium velutinum (Hedw.) B.S.G.
Brotherella recurvans (Michx.) Fleisch.
Bryum capillare Hedw.
Callicladium haldanianum (Grev.) Crum
Campylium chrysophyllum (Brid.) J. Lange
Campylium hispidulum (Brid.) Mitt.
Climacium americanum Brid.
Dicranella heteromalla (Hedw.) Schimp.
Dicranum flagellare Hedw.
Dicranum fulvum Hook.
Dicranum fuscescens Turn.
Dicranum montanum Hedw.
Dicranum scoparium Hedw.
Dicranum viride (Sill. and Lesq. ex Sull.) Lindb.
Ditrichum pallidum (Hedw.) Hampe
Eurhynchium hians (Hedw.) Sande Lac.
Eurhynchium pulchellum (Hedw.) Jenn.
Fissidens osmundoides Hedw.

Fissidens taxifolius Hedw.
Fissidens viridulus (Sw.) Wahlenb.
Grimmia apocarpa Hedw.
Haplocladium virginianum (Brid.) Broth.
Hedwigia ciliata (Hedw.) P.-Beauv.
Homomallium adnatum (Hedw.) Broth.
Hypnum cupressiforme Hedw.
Hypnum imponens Hedw.
Hypnum lindbergii Mitt.
Hypnum pallescens (Hedw.) Broth.
Leskeella nervosa (Brid.) Loeske
Leucobryum glaucum (Hedw.) Angstr. ex Fr.
Mnium ciliare (C. Muell.) Schimp.
Mnium cuspidatum Hedw.
Mnium punctatum Hedw.
Physcomitrium pyriforme (Hedw.) Hampe
Plagiothecium denticulatum (Hedw.) B.S.G.
Plagiothecium laetum B.S.G.
Platydictya confervoides (Brid.) Crum
Platygyrium repens (Brid.) B.S.G.
Pleurozium schreberi (Brid.) Mitt.
Pohlia nutans (Hedw.) Lindb.
Polytrichum commune Hedw.
Polytrichum juniperinum Hedw.
Polytrichum ohioense Ren. and Card.
Polytrichum piliferum Hedw.
Racomitrium heterostichum Hedw.
Rhynchostegium serrulatum (Hedw.) Jaeg. and Sauerb.
Rhytidiadelphus triquetris (Hedw.) Lindb.
Tetraphis pellucida Hedw.
Thuidium delicatulum (Hedw.) B.S.G.
Thuidium recognitum (Hedw.) Lindb.
Ulota crispa (Hedw.) Brid.
Weissia controversa Hedw.

Liverworts

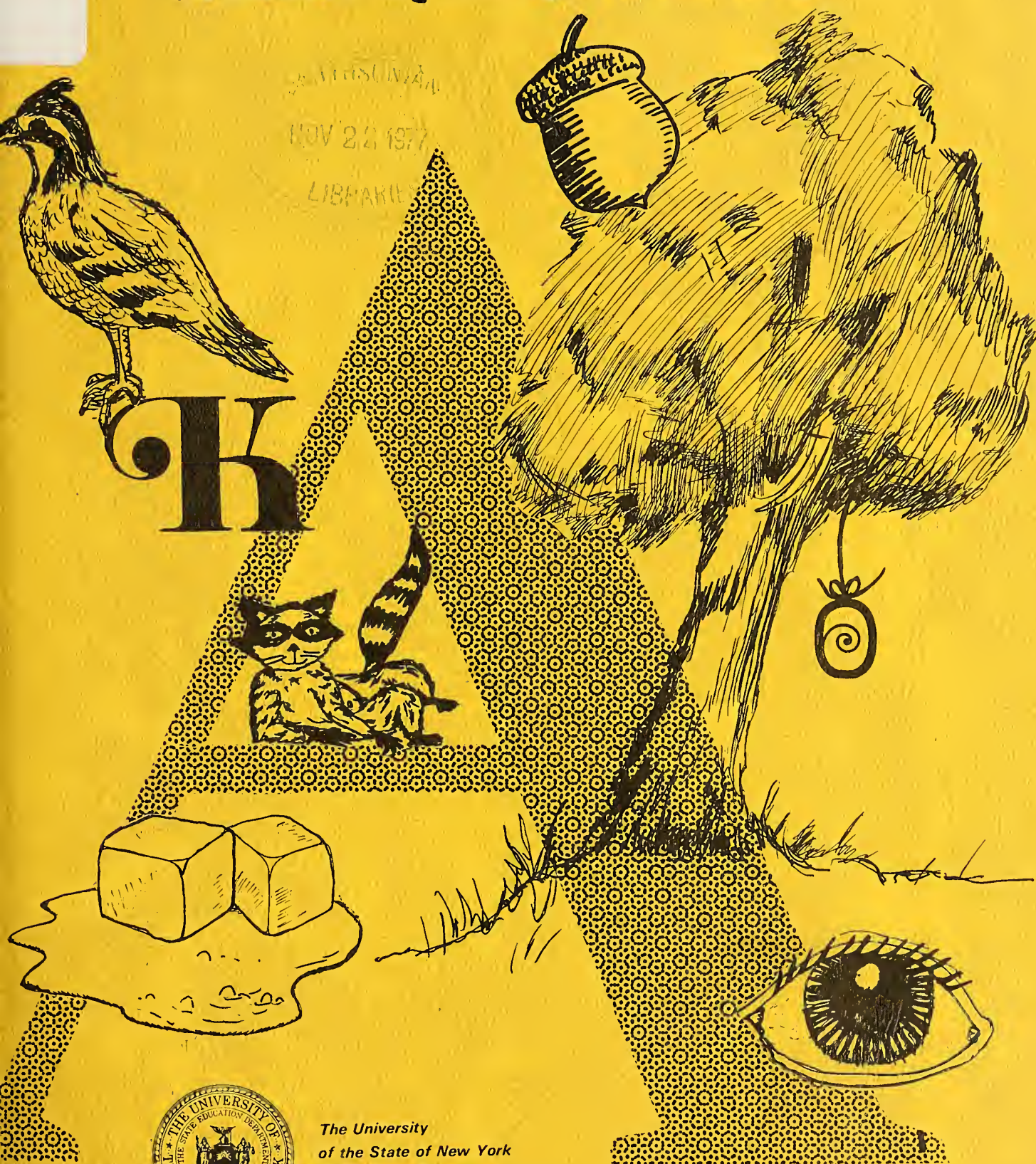
Bazzania trilobata (L.) Gray
Cephalozia bicuspidata (L.) Dumort.
Cololejeunia biddlecomiae (Aust.) Evs.
Jamesoniella autumnalis (D.C.) Steph.
Lophocolea heterophylla (Schrad.) Dumort.
Pellia epiphylla (L.) Corda
Plagiochila asplenoides (L.) Dumort.
Ptilidium pulcherrimum (Web.) Hampe
Radula complanata (L.) Dumort.



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IONTENWENNAWEIENSTANKHWA'

Mohawk Spelling Dictionary



*The University
of the State of New York
ALBANY, N.Y. 12234
The State Education Department*

IONTENWENNAWEIENSTAHKWA'

Mohawk Spelling Dictionary



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PREFACE

While working with the Mohawk Language teachers on the Ahkwesahsne Reservation several years ago, one of the goals we set for ourselves was to produce relevant Mohawk language materials for use in the schools. After overcoming some major hurdles, significant progress was made after agreement was reached on a basic standardized spelling system. This Mohawk Spelling Dictionary is a result of the efforts of those teachers to build their program upon a firm foundation.

The drawings for this edition were created by Brad Bonaparte, Mark Light, Arthur Tarbell and Ricky White, four young students in the Language program. The layout and cover were designed by Frances Johansson.

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Philip H. Tarbell
Specialist in Indian Culture

INTRODUCTION

This volume is the result of a desire among Mohawk teachers, aides, and curriculum planners at Ahkwesahsne for a practical and uniform way of recording their language. It is hoped that it will serve two purposes: one, as a spelling guide to teachers and others writing the language, and two, as a source of new vocabulary for those just now learning to speak.

The entries in the dictionary were chosen, translated, and arranged by Ann Barnes, Louise Cook, Jean Herne, Rita Jacobs, Louise Jock, Harriett LaFrance, Winnie Sinclair, and Elizabeth Tarbell. Grammatical information was then added and the spellings regularized by Mary McDonald and Marianne Mithun-Williams.

In any active language community, dialect differences can be easily found. Different people have different, but equally correct, ways of saying things. Furthermore, any native speaker of a language has a rich assortment of terms for expressing nearly any concept, each with its own subtle flavor. The Mohawk words comprising this dictionary are not meant to represent the only correct equivalents of their English translations. Rather, they are offered as an incentive to others to add to this list and eventually develop a rich record of Mohawk vocabulary.

The spelling system used here is based on the various traditional Mohawk writing systems. A few refinements have been added to make it fit the language better. The need for these refinements has become especially clear as,

more and more, children are learning Mohawk as a second language instead of a mother tongue. Native speakers can often get along with an awkward writing system. As they read, they can supply missing sounds in a text from their mental dictionaries. Learners can only learn to pronounce what is written. The few new symbols in this spelling system represent sound which, although unnecessary in English, are crucial to the correct pronunciation of Mohawk.

The Mohawk spelling system is quite simple. It consists of only 8 consonants:

t, k, s, n, r, w, h, ' ,

6 vowels:

a, e, i, o, en, on,

and stress and length marks:

/, \, : .

The sounds represented by each letter are described below. For anyone just learning the language, of course, the best way to develop correct pronunciation is to work with a native speaker.

Consonants

| Approximate English
Equivalent | | Example |
|-----------------------------------|--------------------------|--------------------------|
| t | <u>d</u> before vowels | <u>ti</u> 'tea' (Dee) |
| | <u>t</u> everywhere else | <u>thi</u> 'there' (tea) |

| Approximate English
Equivalent | Example |
|--|---|
| k <u>g</u> before vowels
<u>k</u> everywhere else | <u>ki</u> 'this' (<u>geese</u>) |
| s <u>sh</u> between h and i
<u>s</u> next to consonants
<u>z</u> everywhere else | <u>ohsi:ta</u> ' 'foot'
(o she da)
<u>skáthne</u> 'together'
(scott neigh)
<u>só:ra</u> 'duck' (zola) |
| n <u>n</u> | <u>ne</u> 'the' (neigh) |
| r <u>l</u> or <u>r</u> | <u>orá:ta</u> ' 'heel'
(o la da) |
| w <u>w</u> | <u>wisk</u> 'five' (wisk) |
| i <u>y</u> before vowels | <u>iah</u> 'no' (yeah) |
| h <u>h</u> | <u>oháha</u> ' 'road'
(oh ha ha) |
| ' the catch in the mid-
dle of oh oh (a mis-
take) | <u>í:'i</u> 'I' |

Because it is not used in English spelling, the glottal stop (') has often been left out of Mohawk writing. This sound is just as important in Mohawk as a t or k, however. It sounds something like the t in English 'aboutthree', when this is said rapidly.

English speakers are not used to hearing h before consonants, because it does not occur there in English. The h in this position can make a lot of difference in Mohawk, however.

Notice the puff of air in the second word below:

tóka' 'if'

tóhka' 'several'.

The h also makes a big difference after a consonant. The air resulting from an h can be felt by placing the fingers before the mouth of a native speaker pronouncing words like the second in each pair below:

tí 'tea'

thí 'there'

tó ní:kon 'How much?'

thó ník:on 'that much'

The combination of letters tsi is pronounced at Ahkwesahsne like 'gee' in 'gee whiz'. This can be heard in:

tsi'ks 'fly'

otsì:tsia' 'flower'

The combination of wh or w sounds something like an English f. Examples of this are:

o'wháhsa' 'skirt'

ohwharà:ne 'caterpillar'.

Vowels

| | Approximate English
Equivalent | Example |
|----|---|--------------------------------|
| a | <u>a</u> as in box | <u>á</u> hta 'shoe' (ahda) |
| e | <u>ai</u> before: as in
bait | <u>né</u> 'the' (neigh) |
| | e as in bet other-
wise | <u>nek</u> 'but' (neck) |
| i | <u>ee</u> as in beet | <u>thi</u> 'there' (tea) |
| o | <u>o</u> as in boat | <u>tho</u> 'there, that' (toe) |
| en | something like um
(pause) or the vow-
el in <u>umpire</u> | <u>en</u> 'yes' (un-) |
| on | something like
<u>noon</u> | <u>ón:wa</u> 'today' (oon wa) |

In every Mohawk word, one syllable is louder than the rest. This syllable is marked with an accent symbol. If the tone on this syllable is high or rising, this is shown by the accent ´. If it is falling, it is shown by ˘. Compare the words below:

oká:ra' 'story'

okà:ra' 'eye'

onón:ta' 'hill'

onòn:ta' 'milk'

If the vowel in a stressed syllable is held longer than the others in the word, it has a length mark, : . Listen to the difference between these words:

tóka' 'if'

tó:ka' 'I don't know'.

This spelling system is very much like that now used at Caughnawaga. Differences in spelling reflect differences between the Caughnawaga and Ahkwesahsne Mohawk dialects. Some of these differences can be seen in the words below.

| | Ahwesahsne
Spelling | Caughnawaga
Spelling |
|----------|-------------------------|-------------------------|
| 'nine' | kióhton
(gyohtoon') | tióhton (johtoon) |
| 'flower' | otsì:tsia'
(ojeeja') | otsì:t'sa' (odzeedza') |

The pronunciation and spelling differences are generally so small that anyone who learns to read one dialect can read the other very easily.

Every language has many regular rules for forming words and sentences. These can be learned from a grammar book. An example of such a rule in English is plural formation. To make a noun plural, speakers usually add -s.

| | |
|------|--------|
| cat | cats |
| sock | socks. |

There are some words, however, which do not seem to behave according to the rules. Look at the plurals of words like:

| | |
|------|-------|
| deer | deer |
| ox | oxen. |

These plurals simply have to be learned with the word. It is these idiosyncracies of words or irregularities which belong in a dictionary.

Mohawk verbs are quite complex. Hundreds of different verbs may be formed from a single verb root by changing the subject or object, the tense, or many other things. If a speaker knows the four principle parts of a verb, however, he can then predict all other forms of the verb by applying the regular grammatical rules. These four principle parts are not completely regular, however. They must be memorized with each new verb. For this reason, the parts are provided with each verb entry in the dictionary. They are always presented in the same order:

| | | |
|----------------|----------------|---------------------|
| command | satekhwá:ko | 'bite it' |
| first person | katekhwákwas | 'I bite it' |
| serial | | |
| indefinite | aiontekhwá:ko' | 'she might bite it' |
| punctual | | |
| masculine per- | rotekhwákwen | 'he has bitten it' |
| fective | | |

Notice that each form provides an example of a different pronoun. Some verbs require human objects. Examples of these verbs will always contain human objective pronouns.

| | | |
|--------------|-----------------|--------------------------|
| command | shè:nonk | 'call someone' |
| first person | khè:nonks | 'I call someone' |
| serial | | |
| indefinite | aiontatì:nonke' | 'she might call someone' |
| punctual | | |

| | | |
|------------|---------------|----------------|
| masculine | shakohnon:kon | 'he has called |
| perfective | | someone' |

Some verbs refer to states rather than actions, so they lack some of the principle parts. Examples of these verbs are provided with various different pronouns.

| | | |
|-----------|-----------------|-----------------|
| happy, be | wakatshenón:ni' | 'I am happy' |
| | satshenón:ni' | 'you are happy' |
| | iakotshenón:ni' | 'she is happy' |
| | rotshenón:ni' | 'he is happy' |

These are only a few of the many pronouns found in Mohawk verbs, but all other forms can be predicted automatically from these four, once the general rules are learned.

Many thanks are due those who so generously provided assistance, especially Betty Kruger, who typed the entire manuscript.

It is hoped that this small volume will not only serve as an aid to teachers and students, but will also spur on others to go further, supplying additions and corrections, so that one day Mohawk children may have a rich record of the language spoken by their ancestors.

Marianne Mithun-Williams
Editor

A

Abraham

Aplám

accomplishment

karihwaierì:ton

acorn

karíhton ohsò:kwa'

Adam's apple

on my Adam's apple

onià:kwa'

kenia'kwà:ke

add, to

taseró:rok

tkeró:roks

taieró:roke'

tehoró:ron



karíhton ohsò:kwa'

Africa

Ratihon'tsìhne

agent

roteríhonte'

Agnes

Ánies

air

ówera

airplane

teká:tens

alcoholic beverage

iakononhwarah̀ton:-
tha' ohné:ka'

Alexis

Aríksas

Alexander

Areksént

alienate someone,
to

sheia'tohtárho
kheia'tohtárhos
aiontakia'tohtárho'
shakoia'tohtárhon

align it, to

tstó:kenht
tektó:kenhs
taietó:kenhte'
tehotokénhton

| | |
|------------------|------------------------------------|
| all | akwé:kon |
| all night | ahsonthakwé:kon |
| allure, an | tek'nikonhratóhtshera |
| alligator | teka'nón:ton/
tekwa'nikahtón:ta |
| along | |
| along the shore | atsiaktónkie' |
| along the wall | ahsohtaktónkie' |
| always | kiótkon |
| Andrew | Athré |
| Angus | Aniá:s |
| animal, domestic | katshé:nen |
| animal, wild | kontírio |
| ankle | ohsinekò:ta' |
| on my ankle | khsineko'tà:ke |
| Ann | Á:nen |
| another person | akó:ren |
| answer, an | tekarihwa'serákwen |
| ants | tsiki'nhontstókhi |
| ape | katsi'nonhtakskó:wa |
| apple tree | sewahió:wane' ó:kwire' |
| apron | ateniion:ta' |

| | |
|------------------|---|
| arch of the foot | kahiakwatá:kwen |
| arm | onéntsha' |
| on my arm | kenentsshà:ke |
| arrow | kaieñ:kwire' |
| as it is | tsi ní:ioht |
| ask, to | seri'wanón:ton
keri'wanón:tons
aieri'wanón:ton'
rori'wanón:ton |
| assigned | karíhonte' |
| assume, to | (ísehre)
í:kehre'
á:ienhre'
rawè:ron |
| attached, mixed | ia'tekaiéston |
| attention | atokenhtshera |
| auction | tehotihenréhtha' |
| autumn | kahnenna'kè:ne |
| axe | ató:ken' |

B



ohkwá:ri

| | |
|------------------------------|---|
| Baxter Hill | tsi iowenohkwakará:te |
| bay, in the | ohshâ:rakon |
| beads | otsi'néhtara' |
| bead work | tekatsi'nehtará:ron |
| beans | osahè:ta' |
| beans, baked | watshahè:tonte' |
| bean soup | osahè:ta' onón:tara' |
| bean, red kidney | onekwenhtara nikasahe'-
tò:ten |
| beans, string, wax,
green | o'rhótsheri |
| bear | ohkwá:ri |
| bear, polar | ohkwari'tara:ken |
| beard | okohstón:ha |
| beat, to | senonhwáre'k
kenonhwáre'ks
aienonhwáre'ke'
rononhwáre' |
| bed | kanákta' |
| bedbug | katsi'nonwákeras |
| bedroom | tsi ienonhwétsha' |
| bedsheets | ioni'tskarónhkhwa' |

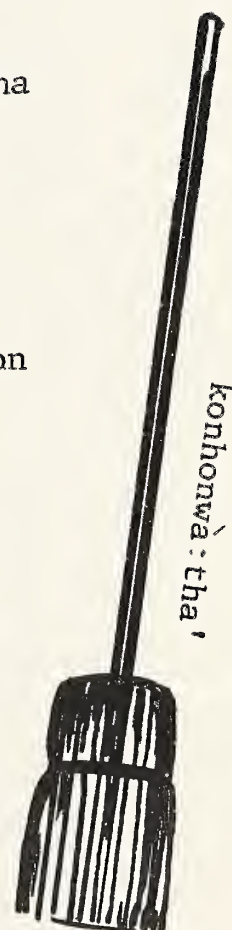
| | |
|-----------------|---|
| bed spread | iontenaktarókstha' |
| bee | otsi'nahkonhtahkwá:ne |
| beechnut | otskèn:ra' |
| beer | onen'tákeri |
| beets | onekwénhtara
nikatsihkò:ten |
| begging | atsheri'táhtshera |
| beg, to | tesatshá:ri't
tekatshá:ri'ts
taiontshá:ri'te'
tehotshari:ton |
| behind | ohná:ken |
| bell | iehwista'ékstha' |
| belly button | onerì:tsta'
keneri'tstà:ke |
| belt | akia'táhna/akia'táhnha |
| belongs to them | aoná:wen |
| belongs to her | akó:wen |
| bend it, to | tetshà:ket
tekshà:kets
taieshà:kete'
tehoshà:kton |
| berry | káhi |
| bicycle | tékeni tekakahkwèn:tote' |

| | |
|------------------------------------|--|
| billfold | iehwistarákhwa' |
| billiard ball | otsíhkwa' |
| bird | otsi'tén:'a |
| bite it, to | satekhwá:ko
katekhwákwas
aiontekhwá:ko'
rotekhwákwen |
| black | kahòn:tsi |
| black ash | ierontáia'ks/
éhsa |
| blackberries | shà:ies |
| blackbird | tsió:kwaris |
| black caps | teiotenharà:kton |
| Black Lake | Otsihkwà:ke tsi
aniatarahòn:tsi |
| blanket | áhsire' |
| block, to | tesenehtháhrhok
tekenehtháhrhoks
taienehtháhrohoke'
tehonehtháhrhon |
| blood
in my blood | onekwénhsa'
akenekwenhsà:ke |
| blood vessel
in my blood vessel | otsinonhiáhton
ktsinonhiahtà:ke |
| blouse | oià:kara' |

| | |
|----------------------------------|---|
| blue | oròn:ia' |
| blueberries | kahrata'kéha' |
| bluejay | terí:teri |
| boat | kahonwé;ia' |
| bobcat | tako'skó:wa |
| bobalink | kwa'kória |
| body
on my body | oià:ta'
kia'tà:ke |
| body, dead | oierón:ta' |
| body, inside | oià:takon |
| body, lower | oreh:ta' |
| boil (on skin) | okwahrò:ta' |
| boil (I have a) | wakatkwahro'takwá:-
ronte' |
| boil it | teshnekónkieht
tekhnekónkiehtha'
taiehnékónkiehte'
tehohnékónkiehton |
| bone | óhskien |
| bonnet, baby | okwirá:'a anòn:warore' |
| on the bottom (of
the stairs) | ehtà:ke |
| boundary | karihstatákie' |

| | |
|--------------------|---|
| bow | a'én:na' |
| boy | raksá:'a |
| bracelet | atenentsháhnha' |
| braids | oratskèn:ta' |
| brain | o'nikòn:ra' |
| Brashar Falls | Kiohrionhó:ken' |
| Brashar iron works | tsi Karihstonníhahkwe' |
| bread | kanà:taro |
| bread, fried | kana'tarakerì:ta' |
| bread, native | kana'tarokhón:we |
| bread, yeast | ka'shehrha'tkénhton |
| break it, to | téshriht
tekhríhtha'
taiè:rihte'
tehohríhton |
| break in two, to | tétsia'k
tékia'ks
taié:ia'ke'
tehoià:kon |
| breast | awentskwè:na |
| on my breast | kentskwe'nà:ke |
| breeze | iówerare' |
| bridge, platform | áhskwa' |

| | |
|---------------------------------|--|
| bring it here | táshaw
tékhas
taiéhawe'
thóha |
| brooch | athniotákhwa' /
athnió:ta |
| broom | konhonwà:tha' |
| broth | ohnekákeri |
| brother (my older) | raktsí'a |
| brothers address
(my older) | tsiatenò:sen |
| brother reference
(my older) | iakiateno'sénha |
| brown | athéhsa |
| buckle | athniáhskari |
| buffalo | tsistikerià:kon |
| bug
bug-hard shell | otsi'nón:wa'
o'nó:wa' |
| build, to | són:ni
kón:nis
aión:ni'
raón:ni |
| bull | teró |
| bullet | oneñ:ia' |
| bullfrog | mararám |



| | |
|-------------------|---|
| bullhead | rabahbót |
| burdock | ohwhohrte'kó:wa |
| bury (a body), to | tsia'táta'
kia'táta's
aieia'táta'
roia'táten |
| butter | owihstóhsera |
| butterfly | tsi'ktsiné:nawen |
| buttermilk | kanon'tí:sa |
| butternut | tiehwá:ta |
| button | otsíhkwa' |
| buy, to | shní:non
khní:nons
aiehní:non'
rohní:non |

C



ó:nenhste'

| | |
|--------------------------------|--|
| cabbage | onéhsio |
| call someone, to | shè:nonk
khè:nonks
aiontatì:nonke'
shakohnón:kon |
| call someone's name,
to | shenà:ton
khenà:tons
aiontatenà:ton'
shokonà:ton |
| call on the tele-
phone, to | satenwennáta
iekatenwennátas
iaiontenwennáta'
iohotenwennáten |
| Canada | Koráhne |
| cancer | í:waks |
| candy, sugar | otsikhè:ta' |
| canoe
birch canoe | kahonwé:ia'
oná:ket |
| cantaloupe | wahíá:ri's |
| cake | teiona'taratsikhè:tare' |
| cap | ionekwèn:tote' |
| cape | teionteweiahrákhwa' |
| careful, to be | se'nikòn:rarak
ke'nikòn:rara'
aionte'nikòn:rara'
wakate' nikonhrarà:ton |
| carrot | otsì:nekwar nikatsikhkò:-
ten |

| | |
|---------------------------------|---|
| carry away, to | iahá:sha
iékhas
ieiéhawe'
iehóha |
| casket | iakenheion'tarákhwa' |
| cat | takò:s |
| caterpillar | ohwharà:ne |
| catfish | onòn:kwe' |
| cause, to | serihón:ni
takarihón:ni
aierihón:ni'
rorihón:ni |
| cause someone dis-
tress, to | sheiakié:saht
kheikiesáhtha'
aiontakié:sahte'
kheiakiesáhton |
| caviar | onè:tara' |
| cedar | onen'takwenhtèn:tshera' |
| ceiling | tsi kentskaráhere' |
| celebration | watonhnnáhere' |
| cellar | ohontsió:kon |
| center | ahsén:non |
| chair
on the chair | ani'tskwà:ra
ani'tskwahráhne |
| chair with woven
seat | tewa'á:raton ani'tskwà:-
ra |

chase something, to

ítsher
íkshere's
aiéhshere'
róhsheron

Chateauquay

Ohsahré:'on

cheat, to

se'nikónhrha't
ke'nikohrà:tha'
aie'nikónhrha'te'
ro'nikonhrhà:ton

cheek
on my cheek

ohnò:kwa' / ohnóskwa'
kehno'kwà:ke/kehno -
skwà:ke

cheese

tsís

cheetah

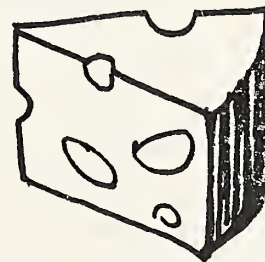
tako'skó:wa

cherry

ori'kó:wa

chest
on my chest

aontskwè:na'
kentskwe'nà:ke



tsís

chest of drawers

karón:to

chestnut

kohsá:tens aotihsò:kwa'

chewing gum

ohnéhta'

chicken

kítkit

chief

roiá:ner

chill something, to

sewístoht
kewistóhtha'
aiewístohte'
rowistóhton

| | |
|---------------------------|--|
| chimney | o'tá:ra' |
| standing chimney | ken'tá:rote' |
| Chinese people | Tehotikahro'thí:io |
| chipmunk | ohriò:ken |
| Chippewa or Creek | Kioheríshon |
| chokecherry | teiakonia'tawén:'eks |
| choose, to | será:ko
kerákwas
aierá:ko'
rorákwen |
| Christmas Day | Rotón:ni wenhniserá:te' |
| Christmas time | tsi nihatonniá:ne nikahá:wi |
| church | ononhsatokenhti |
| clam | takwaré:re/takwaré:ron |
| clans | o'tara'shón:'a |
| I am of the Bear
Clan | wakhskaré:waken |
| he | rohskaré:waken |
| she | iakohskaré:waken |
| I am of the Eel Clan | wakeneniothró:non' |
| he | roneniothró:non' |
| she | iakoneniothró:non' |
| I am of the snipe
clan | wake'nehsí:io |
| he | ro'nehsí:io |
| she | iako'nehsí:io |



ononhsatokenhti

| | |
|--|--|
| I am of the turtle
clan | wakeniáhton |
| he | roniáhton |
| she | iakoniáhton |
| I am of the small
field turtle clan | wakhsennakéhte' |
| he | rohsennakéhte' |
| she | iakohsennakéhte' |
| I am of the wolf
clan | wakkwáho |
| he | rokwáho |
| she | iakokwáho |
| clan mother | ka'nisténhsera |
| clean something, to | tesohtáhrho
tekohtáhrhos
taiakohtáhrho'
tehaohtáhrhon |
| climb in, to | satíta'
katíta's
aiontíta'
rotíten |
| climb out, to | satitáhko
katitáhkwas
aiontitáhko'
rotitáhkwen |
| clock | karahkwakaion:tha' |
| close something, to | sehnó:ton/sehnó:ton
kehnó:tons
aiehnó:ton'
rohnó:ton |

| | |
|-------------------|---|
| closet | ionkia'tawi'tsheraráhkhwa' |
| cloth | onia'tará:'a |
| clothes | atsherónnia' |
| clothes pin | ie'wahstotáhkhwa' |
| coal | o'swèn:ta'/ohswèn:ta' |
| coal stove | iontenonhsa'tariha'-
táhkhwa' |
| coat, dress | akià:tawi |
| heavy coat | akia'tawi'tkó:wa |
| raincoat | kahnehtahrhon akià:-
tawi |
| coconut | katsi'nónhtaks ohsò:-
kwa' |
| cold, it is | iothó:re' |
| collar | tekahnia'sáhere' |
| color | ohsóhkwa' |
| What color is it? | Oh niwahsohkò:ten? |
| comb, a | atkerothí:ia |
| comb, rooster | raonráhsa |
| come, to | ká:ts
tá:ke'
tá:ien'
thawé:non |

| | |
|--|--|
| come in, to | tasatáweia't
tkataweià:tha'
taiontáweia'te'
thotaweià:ton |
| come on! | hánio |
| connect things, to | tesahsónteren
tekahsontérha'
taionhsónteren'
tehohsónteren |
| it is connected | tewahsón:tere' |
| cook, to | sekhón:ni
kekhoón:nis
aiekhóh:ni'
rokhón:ni |
| cook | íseriht
keríhtha'
aié:rihte'
roríhton |
| cookhouse, kitchen | tsi iekhonnià:tha' |
| cookie | karé:t |
| copy, to
(produce exact dup-
licates as a Xerox) | teshnen'netáhko
tekhnen'netáhkwas
taiehnen'netáhko'
tehohnen'netáhkwen |
| copy, to (imitate) | tontasate'nién:tenhst
tetkate'nienténhstha'
tontaionte'nién:tenhste'
tethote'nienténhston |

| | |
|--------------------------------|--|
| corn | ó:nenhste' |
| cornbread | kana'tarokhón:we |
| fresh corn | okahserò:ten |
| dried corn | ionenhstáthen |
| corn silk | okè:ra' |
| on the cornsilk | okehrà:ke |
| ear of corn | skanonhkwén:'en |
| corn husk | aó:ra' |
| kernal of corn | skanénhstak |
| corn meal | ó:nenhste' kathè:ton |
| popcorn | watenenhstatákwas |
| | ioni'tsonhkontákhwa' |
| corn soup | onénhsto |
| cornstalk | óhere' |
| sweetcorn | teionenhstatsikhè:tare' |
| corn tassel | iotenheráhere' |
| white corn | onenhakén:ra |
| white corn flour | onenhakén:ra othè:sera |
| white corn grits | kane'ón:ni |
| hominy porridge | onenhakén:ra kahséhrho |
| yellow corn | otsi:nekwar ó:nenhste' |
| big yellow corn | otsi'nekwahrkó:wa ó:nenhste' |
|
Cornwall Island |
Kawehnó:ke/Kawehnohkowanén:-
ne' |
|
couch |
ionrátsha' |
|
couch cover
(or sheets) |
iontenaktoróktha' |
|
cougar |
tako'skó:wa |
|
councilor |
ratitsiénhaiens |
|
count, to |
sáhshet
kahshé:tas
aiónhshete'
rohshé:ton |

| | |
|---------------------|---|
| cover, to | senón:tek
kenón:teks
aienón:teke'
rononté:kon |
| cover something, to | se'rhó:rok
ke'rhó:roke'
aie'rhó:roke'
ro'rhó:ron |
| cow
cow barn | kiohnhónhskwaront
kiohnhonhskwaróntke |
| crab | tsi'eróhten/otsi'eróhten |
| crabapple | sewahiowane'ón:we |
| crackers | teiokare'tsheráthen/
teiokare'tsherahió:tsis |
| cradleboard | káhrhon |
| cranberries | tó:kwenhre' |
| crane | ohà:kwaron |
| cream | kawistohserókwen |
| crib | owirá:'a ionrátsha' |
| cricket | taráktarak |
| crispy | o'skòn:wa' |
| crock | o'tà:ra' |
| cross | kaiáhsa |

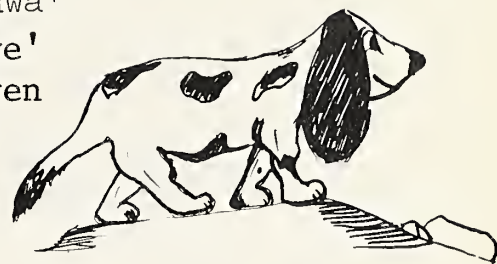


19
tsi'eróhten/otsi'eróhten

| | |
|--|---|
| cross, to | tetsià:ia'k
tekià:ia'ks
taieià:ia'ke'
tehoiahia:kon |
| crow | tsiò:ka'we' |
| crust | ona'watsísten' |
| cry, weep, to | tesahséntho
tekahsénthos
taionhséntho'
tehohsenthó:hon |
| cucumber | tikokón/kanon'onserákeras |
| cup | teionthnekontákhwa' |
| cupboard | ieksahrákhwa' |
| curds | okaiè:ta' |
| cushion | atkòn:sera |
| cut, to | íshre'n
khrè:nas
aiè:re'ne'
rohrè:nen |
| cut through some-
thing, to (sever) | ítsia'k
íkia'ks
aié:ia'ke'
roià:kon |
| cut, to (gouge) | skwè:taron
kkwè:tarons
aiekwè:taron'
rokwè:taron |
| cut up finely, to | tesahríhton
tekahríhton
taiakohríhton'
tehohríhton |

D

| | |
|--|---|
| dance, a | kanónnia |
| dance, to | tesenónniahk
tekennonniákhwa'
taienónniahkwe'
tehononniáhkwen |
| dandruff | awéhara |
| danger | iótteron |
| dark, in the | ahshà:takon |
| daughter, my | kheien:'a |
| day | awenhnísera |
| decide, to | tetsia'tó:reht
tekia'toréhtha'
taieia' tó:rehte'
tehoia'toréhton |
| deep (like a dish)
or high (like a cliff) | teióhshes |
| deer | ohskenón:ton |
| Deer River | Oiekarónthne |
| defend, to | taséhne
takéhne'/tkéhne's
aontaiéhne'
thohné:'on |
| Deseronto | Tekaientané:ken |
| diabetes | teionekwenhshatsikhè:-
tare |
| diaper | athwawen'éktha' |



é:rhar

| | |
|------------------------------|--|
| different | tekia'tíhen/ó:ia ní:ioht |
| dig, to | só'kwat
kó'kwats
aiakó'kwate'
rao'kwá:ton |
| dining area,
(restaurant) | teiontska'hónhkhwa' |
| dirty | teió'tsion |
| dirty, to | tesí'tsionhst
teki'tsionhstha'
taié'tsionhste'
teho'tsionhston |
| disappear | sáhton
káhtons
aionhston'
róhton |
| disease | kánhra' |
| dish
on the dish | akè:ra
akehrà:ke |
| ditch
along the ditch | teionkià:kon/tekahronión:-
ni
teiohronwatákie' |
| do, to | tho ná:tsier
nikakiérha'
naion:kieré'
nihié:ren |
| do it right, to | tasateweièn:ton
tkateweièn:tons
aontaiontèweièn:ton'
thoteweièn:ton |

| | |
|-----------------|--|
| do it right, to | tatsié:ri't
tkié:ri'ts;
aontaieié:ri'te'
thoierì:ton |
| doctor | |
| female | watétsien'ts |
| male | ratétsien'ts |
| dog | é:rhar |
| dogfish | tsia'onharé:ni |
| dollar, one | skanekè:ta/skahnekè:ta/
skahwísta' |
| two | tekahnekè:take/
tekahwístake |
| donkey | tewahónhtes |
| door | kahn hóha/kahnóha |
| dough | kashe'rhón:ni |
| dove | orì:te' |
| down feathers | ohstó:seri |
| drag, to | sè:ser
kè:sere'
aiè:sere'
rò:seron |
| dress up, to | sakia'tahserón:ni
kakia'tahserón:ni
aionkia'tahserón:ni'
rokia'toherón:ni |

| | |
|--------------------|--|
| get dressed up, to | satsherón:ni
katsherón:nis
aiontsherón:ni'
rotsherón:ni |
| drink, to | shnekì:ra
khnekí'hrha'
aiehnèkì:ra'
rohnekì:ren |
| drive, to | sató:ri
katórie's
aiontó:ri'
rotórion |
| drop something, to | sà:senht
ka'sénhtha'
aion:senhte'
ro'sénhton |
| dry, to be | iohstáthen |
| dry, to | sstátha't
kstathà:tha'
aiestátha'te'
rostathà:ton |
| duck | só:ra |
| duck, wild | shónhatsi |
| dull (not sharp) | teiothiò:kton |
| dull (boring) | ioterihón:ko |
| dumpling | onen'óntsta' |

E

| | |
|-------------------|---|
| eagle | à:kweks |
| ear | ohónhta' |
| earring | ate'wáhshare' |
| eat a meal, to | tesatskà:hon
tekatskà:hons
taiontskà:hon'
tehotskà:hon |
| eat something, to | í:sek
í:keks
á:ieke'
rawé:kon |
| eel | kiawerón:ko |
| egg | o'nhónhsa' |
| egg beater | teie'nhonhsawenrie'-
tákhwa' |
| egg shell | o'nhónhsa' ona'watsísta' |
| elbow | ohióhsa' |
| elephant | o'no'tsta'kó:wa |
| Elizabeth | Arísawa |
| elm tree | oká:ratsi |
| elm, slippery | okòn:ra |
| enamel | kaneniáhrhon |
| England | Kiohren'shakà:ke |
| Englishman | Kiohren'shá:ka |



oká:ra'

| | |
|----------------|---|
| epidemic | kahnratarí:ne's |
| erase | será:kehw
kerakè:was
aierá:kehwe'
rorakè:wen |
| eraser | ierakehwáhtha' |
| ermine | onón:kwet |
| escape | se'niá:ken'n
ke'niá:ken's
aie'niá:ken'ne'
ro'niakeñ:'en |
| esophagus | ionhnehkwenà:tha' |
| Europe | Ohontsiakaion:ne/
Ohwentsiakaion:ne |
| evening | o'karahsnéha' |
| everything | orihwakwé:kon |
| exaggerate, to | teserihwanòn:ianiht
tekerihwanonhianíhtha'
taierihwanòn:ianihte'
tehorihwanonhianíhton |
| exchange, to | tesatá:ton
tekatá:tons
taiontá:ton
tehotá:ton |
| eye | okà:ra' |
| on my eye | kkahrà:ke |

eyebrow
on my eyebrow

ona'wá:sa'
kena'wasà:ke

eyelash
on my eyelash

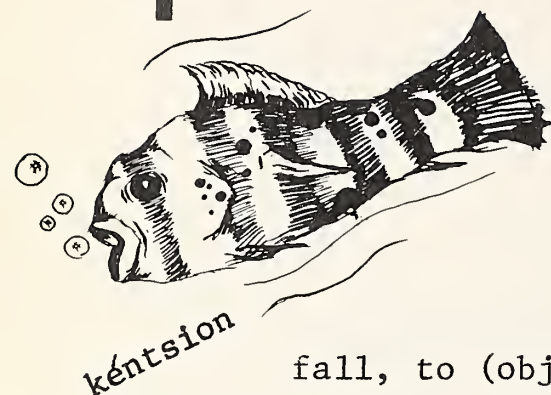
okahréhta'
kkahrehtà:ke

eyeglasses

atkahráhnha/atkahráhnha



F



| | |
|---|---|
| face | okónhsa' |
| fall (autumn) | kahnenna'ke:ne |
| fall, to (living thing) | kia'kié:nen's
aieia'kié:nen'ne'
roia'kienén:'en |
| fall, to (object) | kio'sén:'en |
| fan | kaweraráhtha' |
| fast | io'shátste' |
| fat (human)
(animal) | o'tónsera
oia'takón:ha |
| father, my | rake'níha |
| fault, your
my | sarì:wa'
akerì:wa' |
| fawn | ohskenón:ton owí:ra'/
iotsitohkwaronión:'a |
| fear, to you
I
he
she | sahterón:ni
wakhterón:ni
rohterón:ni
iakohterón:ni |
| feather | ohstó:seri |
| female (animal)
(person) | o'nhéhkien
iothonwí:sen |
| fence
inside the fence
on the fence | aten'èn:ra'
aten'èn:rakon
aten'enhrà:ke |
| fever | iako'tonhkwáhros |

| | |
|----------------------|---|
| fibber, liar | atshó:ken |
| fiddle | o'nó:wa' |
| fight, a | ateriíóhtshera |
| fight, to | saterí:io
katerí:ios
aionterí:io'
roterí:io |
| fill something, to | táshraht
tekhráhta'
aontaiè:rahte'
thohráhton |
| find, to | setshén:ri
ketshénrie's
aietshén:ri'
rotshénrion |
| finger | ohsnónhsa' |
| finger nail
on my | otsi'é:ra'
ktsi'erà:ke |
| finish it, to | ítsha
íkhshas
aiéhsha'
róhshon |
| fireman | ra'swáhtha' |
| fire truck | wa'swáhtha' |
| fish
fish eggs | kéntsion
onè:tara' |
| fish hook | à:ria |

| | |
|------------|--|
| fish hawk | ohà:kwaron |
| white fish | skentstakeń:ra |
| fish worm | otsinowenhne'ta' |
| fist, my | waktsihkwakwe'noń:ni |
| fix it, to | skwatá:ko
kkwatákwas
aiekwatá:ko'
rokwatákwen |
| flame | o'tónhkwa' |
| flea (dog) | atá:we |
| (human) | otsì:non |
| floor | ohson'karà:ke |
| flour | ohthè:sera |
| flower | otsì:tsia' |
| flowerbed | tsi katsi'tsiaiéntho |
| fly house | tsi'ks |
| horse | onerón:ta |
| black | onen'ón:ra |
| dragon fly | tsikenon'warísta' |
| fly, to | tetsí:ten
tekí:tens
taié:ten
tehó:ten |
| foam | ohwà:tsta' |

| | |
|---------------------------|---|
| fold something, to | shwe'noón:ni
khwe'noón:nis
aiehwe'roón:ni'
rohwe'noón:ni |
| food | kákhwa' |
| food (groceries) | atenà:tshera |
| food, cooked
left-over | iókhwari
iotekhwatatèn:ron |
| foot
on my foot | ohsì:ta'
kahsi'tà:ke |
| footprint | tehaianón:ni |
| force something, to | tasanoónhton
tkanoónhtons
aontaienoónhton
thononhtón:'on |
| forever | tsi nén:we |
| forget, to | sa'nikóónhrhen
wake'nikóónhrhens
aiako'nikóónhrhen'
ro'nikóónhrhén:'en |
| fork | tsiao'estákhwa' |
| Fort Covington | Kentsia'kowáhne |
| forward | ohèn:ton |
| fox | tsítso |
| France | o'seronni'onwè:ne |

| | |
|--|---|
| Frenchman | o'serón:ni |
| freeze something, to | senenniò:kwenohst
kenenio'kwenóhstha'
aieneniò:kwenohste'
ronenio'kwenóhston |
| Friday | Wískhaton/
Ronwaiatanontákton |
| friendship
my female friend
my male friend | aterò:sera
onkiátshi
onkiatén:ro |
| frightful | iótteron |
| fringe | teiihseriè:tote' |
| frog | otskwà:rhe' |
| Frogtown | Otskwa'rhéhne |
| frozen
frozen water | ioneniò:kwano
iowíseren |
| fruit
preserves | káhi
watahiateweièn:ton |
| fry, to | stakerì:ta
ktakerì:tas
aietakerì:tahwe'
rotakerì:ton |
| full to the brim | kanà:non |
| full | tetkáhere' |

G

gall

ótshahte'

gamble, to

tétsien
tékiens
taié:ien
tehó:ien

gang

kanèn:ra

garbage

watekhwakéntston

garters

ahtshíhna'

gather, to

serò:rok
kerò:roks
aierò:roke'
rorò:ron

get, to go

iahá:sko
iékhwas
iaié:ko'
iohókwen

get married, to

sániak
(wakéniaks)
aiakwéniake'
roniá:kon

get up, to

satkétsko
katkétskwas
aiontkétsko'
rotkétskwen

girl

ieksá:'a

give to me, to

tá:kon
taká:wis
aión:kon
raká:wi



| | |
|-----------------|---|
| glass | ó:wise' |
| glove | a'nià:nawen |
| glutton | ani'tshého |
| gnats | o'keń:ro otsi'nón:wa' |
| go, to | wá:s
wà:ke'
á:ion'
rawé:non |
| go away, to | sahtén:ti
kahténkie's
aionhtén:ti'
rohténkion |
| go around, to | tasahkwatá:se'
tkahkwatá:se's
aiontaionhkwatá:se'
thohkwatá:se |
| go back, to | sasáhket
skáhkets
aonsiónhkete'
shóhkton |
| go get, to | skóha
kkóhas
aiekóha'
rokóhon |
| go look for, to | sesákha
kesákhe's
aiéhsake'
rawesá:kon |

| | |
|-----------------|---|
| go out, to | tsiá:ken
kiá:ken's
aieiá:ken'ne'
roiakén:'en |
| goalie | tehatenia'tarenónhnha' |
| goat | kaia'tákeras |
| gold | ohwistanó:ron |
| goose | tewénnia'ke' |
| gooseberry | ohkwá:ri raonáhi |
| gossip | karihwakaténhtshera |
| grasp, to | tsié:na
kié:nas
aieié:na'
roié:na |
| grandfather, my | raksótha |
| grandmother, my | akhsótha |
| grape | onénhare' |
| grapefruit | iohiatská:ra |
| grasshopper | tsistá:rare' |
| Grass Lake | Ohsa'kentà:ke |
| grate, to | ísket
íkkets
aié:kete'
roké:ton |



| | |
|------------|-------------------|
| gravel | o'néhtara' |
| gravy | ohshé:rha/rasós |
| green | óhonte' |
| grey | ta'kenhróhkhwa' |
| ground hog | anonhwaráweron |
| group | kenkióhkwa' |
| guinea hen | tekahson'kária'ks |
| gums | oiénhta' |

H

hair
 curly
 she has curly hair
 hairdo
 combed hair

onónhkwis
 teiónhkeri
 teiakonónhkeri
 kako'tsiahserón:ni
 kokerothí:hen

ohtsià:na

half, middle, center

ahsén:non

hamburger

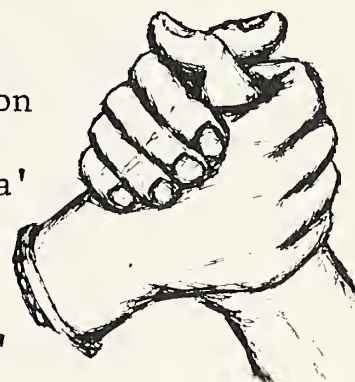
teka'wahrarihton

hammer

iene'konhréstha'

hammer, to

sene'kòn:rek
 kene'kòn:reks
 aiene'kòn:reke'
 rone'kòn:re'



hand

ohtsià:na

handkerchief

iontsi'nonhkerà:tha'

handle, a

onekerehétshen

hang, to

seniíon:ten
 keniíon:tha'
 aieniíon:ten'
 roní:ionte'

happy, I
 you
 she
 he

wakatshenón:ni'
 satshenón:ni'
 iakotshenón:ni'
 rotshenón:ni'

hard (solid)
 hard water

iohní:ron
 iohnekaní:ron

harvest

kaienthókwen

| | |
|----------------------------------|---|
| harvest, to | tsienthó:ko
kienthókwas
aieienthó:ko'
roienthókwen |
| hat
hat with brim | anòn:warore'
teiotà:ronte' |
| hat band | tewatenon'warahnáktha' |
| hate, to | (ítshon)
íkhshons
aiéhshon
rohshón:'on |
| have one's way, to | tasanónhton
takanónhtons
aontakanónhton
thononhtón:'on |
| hay | onékeri |
| head
on my head
in my head | onón:tsi
kenontsĩ:ne
kenontsĩstakon |
| headband | tewatenon'warahnáktha' |
| headdress | kahstówa |
| heart
on my heart | awé:ri
akwerià:ne |
| heater | iontenonhsa'tariha'tákhwa' |
| heel | orá:ta'
keratà:ke |
| Helena | Ohiakaronóhtne |

| | |
|--------------------|---|
| hell | onéhson |
| hello | shé:kon
kwé kwé |
| help, to | takshié:non
katatshnié:nons
aionkhsnié:non'
rakhsnié:non |
| hem | tekakwáthon |
| hemlock | onen'ta'ón:we |
| her (emphatic) | akáonha |
| here | kén:'en |
| here, right | kén:tho |
| hickory tree | onennóhkara' |
| hide something, to | sáhseht
kahséhtha'
aiónhsehte'
rohséhton |
| hide oneself, to | satáhseht
katahséhtha'
aiontáhsehte'
rotahséhton |
| him (emphatic) | ráonha |
| hip | oneskwà:rha |
| on my | keneskwa'rhà:ke |
| hippopotamus | kwéskwes kanonwakón:ha |

| | |
|--------------------|--|
| hire something, to | saténhna'
katénhna's
a'onténhna'ne'
rotenhná:'on |
| hoe, a | atshò:kten' |
| Hogansburg | Tekahson'karó:rens |
| hole | iokà:ronte'
iohson:waién |
| hoof | otsinarèn:ta' |
| hook | kahniò:kwa' |
| hook, to | sehnio'kwa'tsherotáhrhok
kehnio'kwa'tsherotáhrhoks
aiehnio'kwa'tsherotáhrhoke'
rohnio'tsherotáhrhon |
| hopefully | aiá:wén's |
| horn (antler) | onà:kara' |
| horse
stable | kohsá:tens
kohsaténhsne |
| hose (socks) | ká:ris |
| house
log house | kanónhsa'
tekaronta'seroónnion' |
| hummingbird | ráonraon |
| hungry, to be | I
you
she
he |
| | katonhkária'ks
satonhkária'ks
iontonhkária'ks
ratonhkária'ks |

hunt, to

sató:rat
kató:rats
aiontó:rate'
rotorá:ton

hurry up!

óksa

hurry, to

tesasteríhen
tewaksteríhens
taiakosteríhen'
tehosteríhen



ráonraon

I (emphatic)

í:'i

ice

ó:wise'

under the ice

owisó:kon

ice hockey

tehontsihkwá'eks owisä:-
ke

if

tóka' shí:ken

immediately

kwah ó:nenk

inch

tsioweiónhkara'

Indian

onkwehón:we

Indian lg or ways

onkwehonwehnéha'

Ahkwesahsne dialect

Ahkwesahsnéha'

insult, an

kahsenhtáhtsheron

insult someone, to

shéhshenht
khehshénhtha'
aiontatathshénhten'
shakonshénhton

intestines

okahróhsta'

iron

karihstatsi

iron, to

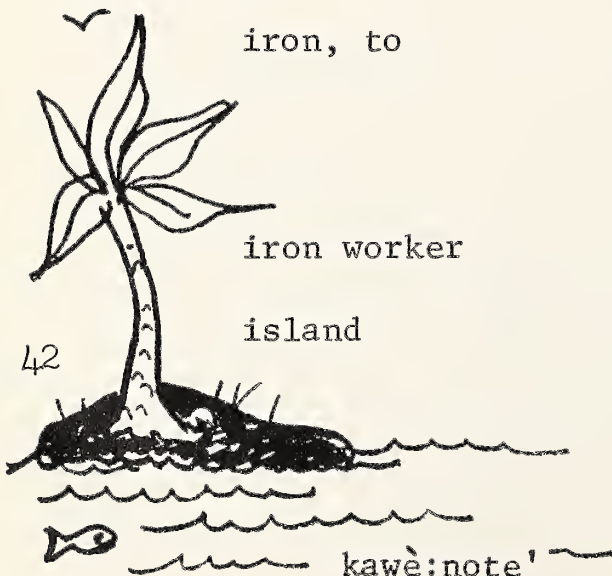
serihstáhrho
kerihstáhrhos
aierihstáhrho'
rorihstáhrhon

iron worker

rarihsta'kehró:non'

island

kawè:note'



isn't it?

wáhe'

Italy

Tariiénhne

Italian

Tariién

J



wahstéhton

jacket

oneró:kwa'

jam, jelly

wahstéhton

Japanese

Tehotikahro'thí:io

jaw

o'rhiótsha'
ke'rhiotshà:ke

jewelry

ohwistanoron'shón:'a

joint
human

teiohstón:tere'
ohstonteri:tshera'

judge, a

tehaia'toréhtha'

judge, to

tetsia'tó:reht
tekia'toréhtha'
taieia'tó:rehte'
tehoia'toréhthon

juice

kahnekinékénhon

just a while ago

kwahòn:wa'k

K

kangaroo

iohna'táhtsheronte'

keep it

saterá:ko
katerákwas
aionterá:ko'
roterákwen

kerchief

teiontenon'warahnáktha'

kerosene

thahseróhkhwa'

key

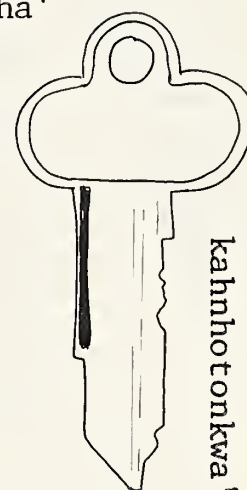
kahnhotonkwa'

kidney

otskiéhseri

kill something, to

sério
kérios
aiério'
rório



Kingston

Ka'taróhkwi'

kitchen

teiontska'nhońhkhwa'

knee

okwítsha'
kkwitshà:ke

kneel, to

tesatatshó:ten
tekatatshótha'
taiontatshó:ten'
tehotatshó:ten

knife

à:share'

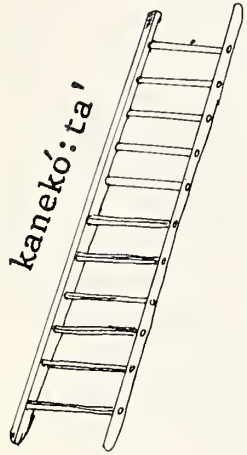
knock, to

sehnhoháia'k
kehnhoháia'ks
aiehnhoháia'ke'
rohnhohaià:kon

know, to

saterièn:tare
aiakoterièn:tarake'
rokaterièn:tare'

L



lace

Lacrosse & hockey

ladder

lady

ladybug

lamp

lantern

later

laugh, to

lawn

leaf

learn, to

least, at

leather

leech

leg

á:'are'

tehona'tsi'kwá:'eks

kanekó:ta'

aikoń:kwe

iakoń:kwe otsi'noń:wa

oháhshera

koháhshera

wá'tsi'k

saiéshon

aiakoiéshon

wakiéshon

kahentà:ke

ónerahte'

satáweienhst

kataweiénhstha'

aiontáweienhste'

rotaweiénhston

arà:ne

óhna'

tsirakwarón:ne

ohsí:na'

khsinà:ke

| | |
|----------------------|---|
| legging | iontshinenko'tohróktha' |
| lemon | teiohiahiò:tsis |
| lend to someone, to | shé:ni
khé:nis
aiontáteni'
shakoníhen |
| leopard | tako'skó:wa |
| let someone, to | sheríhon
kheríhons
aiontateríhon
shakoríhon |
| let something go, to | sátka'w
katkà:was
aiontká'we'
rotkà:wen |
| lettuce | onerahtekáhte' |
| let's | hánio |
| lice | otsì:non |
| lie, a | onò:wen |
| lie down, to | sá:rat
ká:rats
aioh:rate'
rorá:ton |
| light | oháhshera |
| light, to | saté:ka't
katekà:tha'
aionté:ka'te'
rotekà:ton |

| | |
|----------------------|---|
| lightning | tewa'tsiraríkhons/
tewani'nekará:was |
| linoleum | ionthnehtakwenhtahrohstha' |
| lion | kèn:riks |
| lip
on my lip | óhsa'/orì:t'sa'
keri'tsà:ke |
| liquid | ohné:ka' |
| liquor | iohnekahnì:ron |
| listen, to | satahónhsatat
katahónhsatats
aiontahónhsatate'
rotahónhsatate' |
| little (small) | niwá:'a |
| little (no much) | ken' nikon:ha |
| little, a | ohstón:ha |
| live (to be alive) | kónhne'
sónhne'
iakónhne'
rónhne' |
| liver
on my liver | othwénhsa'
kethwenhsà:ke |
| living room | tsi kanonhsí:io |
| lobster | otsi'eróhta' |
| lock, a | o'nó:wa |

lock it, to

senietháhrhok
kenietháhrhoks
aienietháhrhoke
ronietháhrhon

lollipop

ka'nhióhare'

look, to

satkátho
katkáthos
aiontkátho'
rotkáthon

lumber

ohsòn:kare'

lumber camp

shetíhne

lump

iotakwá:ronte'

lung

otsinà:kwa'
ktsina'kwà:ke

M

make, to

són:ni
kón:nis
aiakón:ni'
raón:ni

make it even, to

sha'téstat
sha'téktate'
sha'taié:tate'
sha'tehotá:ton

male person
animal

rohskén'rakéhte'
rá:tsin

Malone

Tekanatà:ronhwe'

maple, hard sugar

wáhta'

maple, soft

ohwisto'kéha'

marriage

kaniákon

martin

aseranó:ha

mask

iontkonwaroróktha'

Massena

Kentsià:ke

mat

ionrahsi'tokewáhtha'

mattress

kéntskare'

maybe

tóka' nón:wa

meadow

kahentà:ke

meadowlark

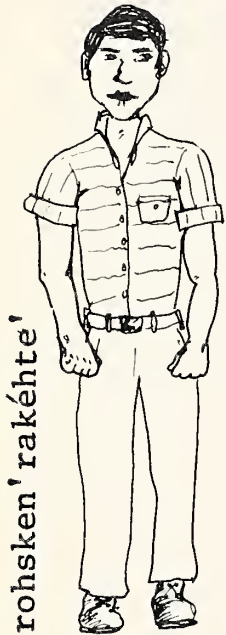
teiothwistáhere'

meat

o'wà:ron

smoked meat

kaien'kwararíhton



| | |
|-------------------------|--|
| meat pie | tka'wà:ra' |
| medicine | onónhkwa' |
| meet someone, to | tetsiatátken
teiakiatátkens
taiontátken'
tehonatátken |
| meeting | watkenníson |
| melon | wahíá:ris |
| melted | iowistanawén:'en |
| they (masc. emphatic) | ronónha |
| mercy | atenniteráhtshera |
| mesh | á:'are' |
| midnight | ahsónthen |
| milk | onòn:ta' |
| mind, the
on my mind | o'nikòn:ra'
ke'nikonhrà:ke |
| mink | aió:ha |
| minnow | kanión:ta |
| mirrow | atátken |
| miss, to | sesáte'waht
skate'wáhtha'
saíónte'wahte'
shote'wáhton |
| mittens | a'nià:nawen |

| | |
|---------------|--|
| mix, to | tesawénrie'
tekawénrie's
taionwénrie'
tehowénrie' |
| Mohawk | Kanien'kehá:ka |
| Moira | shakorontakehtstátske' |
| molasses | kahsehstahòn:tsi |
| mole | otsi'nión:kara' |
| Monday | wententawén'kie' |
| money | ohwísta' |
| monkey | katsi'nónhtaks |
| month | enhni:ta' |
| Montreal | Kiohkià:ke |
| moon | karáhkwa |
| moose | ska'niónhsa' |
| map | iontenonhsohare'tákhwa' |
| more | é:son |
| morning | ohrhon'ké:ne |
| morning, this | ohrón'ke |
| mosquito | okariahtà:ne' |
| mother! | istá |
| my mother | ake'nisténha |

| | |
|----------------------|---|
| mountain | ionón:te' |
| mouse | otsinó:wen |
| moustache | okonhstón:rha' |
| mouth | tsitshakà:ronte' |
| move over, to | sátkwi't
katkwì:tha'
aiontkwi'te'
rotkwì:ron |
| movie | teióia'ks |
| much | é:so |
| very much | kwáh í:ken tsi é:so |
| mullet | skentstakén:ri |
| red finned
mullet | onekwénhtara
nihatorò:ten |
| mush | kashé:rho |
| music | karén:na' |
| musical instrument | waterennótha' |
| muskalonge | kanò:tsot |
| muskrat | anò:kien |

N

nail

kanón:ware'

name

kahsén:na'

name someone, to

shehsén:non
khehsén:nons
aiontatshén:non'
shakohsenná:wi

nationality (your)

tsi nihsonhontsò:ten

navel

onerì:tsta'
keneri'tstà:ke

neck
on my

oniá:ra'
keniarà:ke

necklace

ohstaró:kwa

need, to

tewakatonhontsió:ni
tesatonhontsió:ni
teiakotonhontsió:ni
tehotonhontsió:ni

needle

ie'nikhónhkhwa' kanón:-
ware'

Negro
man
woman

rahòn:tsi
iehòn:tsi

nest

otsi'nhákhwa'

net

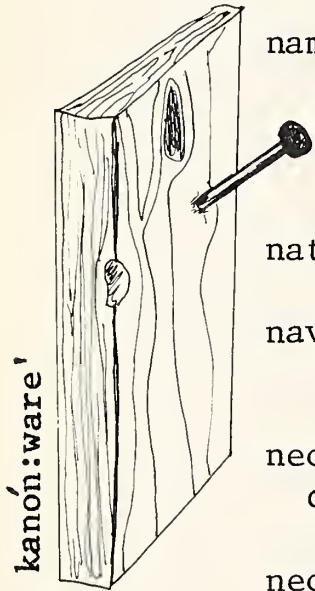
á:'are'

new

á:se'

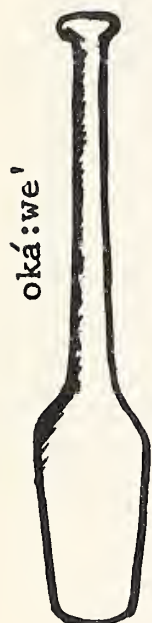
newspaper

tekonrénie's



| | |
|---------------|--|
| New York City | Kanón:no |
| New Year | ohserá:se' |
| night time | ahsonhthen:ne |
| nipple | okónhkwara' |
| on my nipple | kkonhkwara:ke |
| no | iáh |
| Norfolk | Kanatasé:ke |
| notice, to | sáttok
kattó:kas
aiónttoke'
rottó:ken |
| nose | o'niónhsa' |
| on my nose | ke'nionhsà:ke |
| not yet | iáh arok |
| now | ó:nenk |
| nun | iakoia'tatokénhti |
| nut | ohsò:kwa' |
| hazel nut | teiotitá:ronte' |
| hickory nut | onenóhkara' |

O



oak

otokénha

oar

oká:we'

oath

aierihwaní:rate'

of course

ne' ki' wahe'

off (peeled or hanging)

iotera'nontáhsion

often

iotká:te

Ogdensburg

Sewé:katsi

oil

kén:ie'

Oka

KanenhSATà:ke

onion

o'niónkseri/à:non

onion sets

ie'nionkserótha'

only

nek ié:ken

Ontario, Lake

Kaniatarí:io

open, to (door)

sehnhotón:ko
kehnhotónkwas
aiehnhotón:ko'
rohnhotónkwen

orange

okiareh:ta'

oriole

okiaren'ta'kó:wa

ostracize someone, to

sheia'tohtáhrho
khia'tohtáhrhos
aiontakia'tohtáhrho'
rowaia'tohtáhrhon

| | |
|--------------------|------------------------------------|
| other side, on the | íse' nenkwá:ti |
| otter | tawí:ne |
| out | átste' |
| out house | átste' tsi -
ientákhwa'/koráhne |
| over here | kén nonkwá:ti |
| owl, small | kwararó:ha |
| owl, white | tsistékeri |
| oyster | takwaré:re |

P



| | |
|------------|---|
| package | onerótshera' |
| page | iora'wíhstote' |
| pail | ón:ta |
| paint | okóntshera |
| paint, to | skontsheráhrho
kkontsheráhrhos
aiekontsheráhrho'
rokontsheráhrho' |
| pair | tsioiá:na |
| pale | ohskenená:ta' |
| palm | óhsia' |
| on my palm | khsia:ke |
| pancakes | ora'wíhsta' |
| pants | atháhsteren |
| paper | kahiatónhsera |
| parallel | teionathaharákie' |
| paralysis | kaia'takenheiónhtshera' |
| parrot | tekáhskia'ks |
| partridge | ohkwé:sen |
| pass, to | satóhetst
kato hétsha'
aiontóhetste'
roto hétste'/
roto hétston |

| | |
|------------------------|---|
| patch | kenhnennentákton |
| patchwork | tekahnakhánion' |
| patients | rotinonhwaktanioń:ni |
| patient, to be | sate'nikonhrí:iohst
kate'nikonhriiíoħstha'
aionte'nikonhrí:ioħste'
rote'nikonhriiíoħston |
| pea | onékwa' |
| pod | onó:ra' |
| peapod | onékwa' ono:ra' |
| peaches | tekakonhkwará:ron |
| peacock | skanaiehkó:wa |
| peal (a bell) | iohwístakahre' |
| peel, to | sera'wihstóħthsion
kero'wihstóħthsions
aiera'wihstóħthsion
rora'wihstóħthsion |
| peelings | ora'wíħsta' |
| peg | nika'wahstésħa |
| pencil | ohiatońhkhwa' |
| people, crowd of | ionkwè:ne |
| people, large crowd of | kenenhrowá:nen |
| pepper | kiohnonhkwátsheros |

| | |
|------------------------------|---|
| perch | oiahè:ta' |
| person, one | tsionkwè:ta |
| pheasant | ohkwé:sen' |
| pick, to (as for
fruit) | ísko
íkkwas
aié:ko'
rókwen |
| pick up, to | té:sekw
tekékhwa'
tá:iehkwe'
tehawéhkwen |
| pick axe | otsiweiòn:ta' |
| pickerel | tsikon'hses |
| pigeon | orì:te' |
| pigeon-toed | teshá:kwaion |
| pie, fruit | tewà:ia |
| pig
sty | kwéskwes
kweskwéshne |
| pike (northern)
wall-eyed | tsikon'hses
skakahráksen |
| pillow | atkòn:sera |
| pin, safety | tewatotáhrhoks |
| pin, straight | tsio'níhsto |
| pine | ohnéhta' |

| | |
|------------------|--|
| pill | onékwa' |
| pink | wahshèn:ra |
| pipe (smoking) | kanèn:nawen |
| pity someone, to | shé:tenhr
khé:tenhre'
aiontatí:tenhre'
shakotèn:ron |
| plant, to | tsiéntho
kiénthos
aieiéntho'
roiéntthon |
| plate | akè:ra' |
| play, to | sátswa't
katswà:tha'
aióntswa'te
rotswà:ton |
| pneumonia | iakotsina'kwennóhston |
| pocket | iohna'táhtsheronte' |
| Polish | Tharontatihénthos |
| poolstick | teietsihkhwaiéntáhhkwa'
kà:nhien' |
| poplar | onerahtón:ta' |
| porch, on the | ahskwen'nà:ke |
| porcupine | anèn:taks |
| possible | wà:tons |

| | |
|-------------|---|
| potato | ohnennà:ta' |
| sweet | teiohnenna'tatsikhè:tare' |
| potato bug | rahnenna'takárias |
| Potsdam | tsi Tewa'tentararé'nie's |
| pottery | o'tá:ra' |
| pour, to | tasáweron
tkáwerons
aiontaión:ron'
thóweron |
| pray, to | sateréñ:naién
kateréñ:naiéns
aionteréñ:naién'
roteréñ:naién |
| prepare, to | skwatá:ko
kkwatákwas
aiekwatá:ko'
rokwatákwen |
| propeller | okawè:tshera |
| prove, to | serihwahní:rat
kerihwahní:rats
aierihwahní:rate'
rorihwhnirá:ton |
| pull, to | tasatihéñtho
tkatihéñthos
aiontaiontiheñtho'
thotihéñthon |
| pulley | tewatkahraté'nie's
o'nó:wa |
| pulse | teiawenriá'hkhwa' |

| | |
|------------------------|---|
| pumpkin | onon'onsera'kó:wa |
| punish someone, to | shehré:waht
khehrewáhta'
aiontathré:wahte'
shakohrewáhton |
| purple | arihwawa'konhnéha' |
| purse | kahná:ta' |
| pus, rotten | iótken |
| push, to | iahà:shrek
iékhreks
iaie:reke'
iohohré:kon |
| put something away, to | sataweièn:ton
kataweièn:tons
aionteweièn:ton
roteweièn:ton |
| put something down, to | ítsien
íkiens
aié:ien'
ró:ien |
| put one's coat on, to | sakià:tawi't
kakia'tawì:tha'
aionkià:tawi'te'
rokia'tawì:ton |



o'tá:ra'

Q

quail

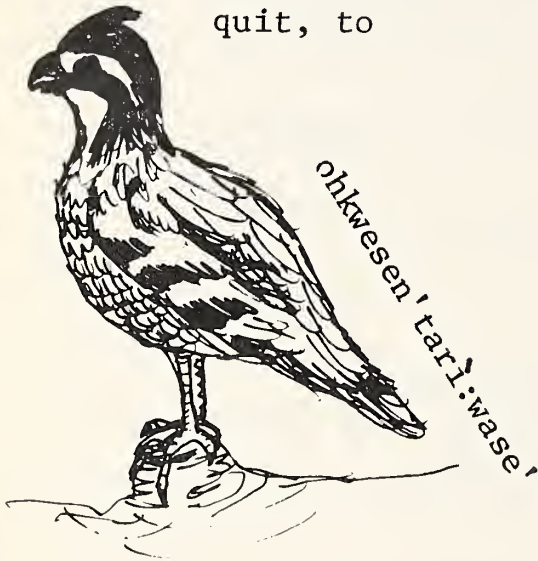
Quebec

quit, to

ohkwesen'tari:wase'

Tekianontari:kon

sateríshen
kateríshens
aionteríshen'
roteríshen



R

rabbit
jackrabbit

kwaién:/tehahonhtané:ken
tehahonhtanekenhkó:wa

raccoon

atì:ron

race, to

tesaré:ron
tekaré:rons
taionré:ron'
tehoré:ron

race, a

tewaré:ron

Racquette

Ahnawà:te'

Racquette River

Nihahnawà:te'

radish

oitsihkwatská:ra'
otsihkwakáhte'

raft

ennísera

rafters

watenenhstahéhrha'

railroad tracks

karihstatákie'

raining, to be

iokanó:ron

raise something, to

shará:tat
khará:tats
aiehará:tate'
roharatá:ton

raisin

o'nénhare'

rash, a

I have a rash
She
he

ata'kerákhwa'
wakata'kerahkwén:ni
iakota'kerahkwén:ni
rota'kerahkwén:ni

raspberry

skanekwen'tará:ni



atì:ron

| | |
|---------------------|--|
| rat | otsinowenhkó:wa |
| Raymondville | tsi Iakokiéhtha' |
| ready, to get | satateweienén:ta'
katateweienén:ta's
aiontateweienén:ta'ne'
rotateweienentá:'on |
| reason, a | ori:wa' |
| receive, to | tsié:na
kié:na
aieié:na'
roié:nen |
| red | onekwénhtara' |
| redwinged blackbird | watahiáhnes |
| reins | áhshara/ahshá:ra' |
| remember, to | sehià:rak
kehià:ra's
aiehià:ra'ne'
rawehiahrá:'on |
| repeat, to | tontasathna'néta'
tetkathna'néta's
taiontaionthna'néta'
tethothna'néton |
| rest, to | satoríshen
katoríshens
aionteríshen'
roteríshen |
| restaurant | teiontska'nhónhkhwa' |

| | |
|-----------------------|---|
| relax, rest, to | tetasaterà:karon
tetkaterà:karons
taionterà:karon'
tethoterà:karon |
| receive something, to | tontasáhket
tetkáhkets
taiontaioñhkete'
tethóhkton |
| rhubarb | ohstawì:na |
| rib
on my rib | ona'áhta'
kena'ahtà:ke |
| ribbon | kà:nhes |
| rice | onatsiakén:ra' |
| ride, straddle, to | sahsá:ten
wakhsá:tens
aiakohsá:ten'
rohsatén'én |
| right away | ó:nenk |
| ring, a | anihsnónhsawi |
| rip something, to | serátsion
kerátsions
aierátsion
rorátsion |
| road | oháha' /owáha' |
| roast, a | watè:skonte' |

| | |
|------------------------------|--|
| roast, to | sate'skón:ten
kate'skóntha'
aion'skón:ten'
rotè:skonte' |
| robin | tsiskò:ko |
| rock | onién:ia' |
| rock, flat
on a flat rock | otstèn:ra'
otstenhrà:ke |
| root
on a root | ohtè:ra'
ohtehrà:ke |
| rub, to | seránie'
keránie's
aieránie'
roránie' |
| run, to | tesaráhtat
tekaráhtats
taionráhtate'
teharáhtats |
| run away, to (escape) | se'niá:ken'n
ke'niá:ken's
aie'niá:ken'ne'
ro'niakén:'en |
| runner (as on sleigh) | oiá:na' |
| rust | ohskèn:rha |
| rusty | iohskèn:rhare' |

S

sack

ká:iare'

sad, crying, to be

sa'nikonhráksen
wake'nikonhráksens
aiako'nikonhráksen
ro'nikonhraksén:'en

St. Regis

Ahkwesáhsne

sailor

rahonweia'kehró:non'

salary

kakarià:ktshera'

saliva

ótskeri

Salmon River

Kentsia'kowáhne

salt

kiohiò:tsis

salty

teiohiò:tsis

salt pork

teio'wahrahiò:tsis

Saturday

Wentákta' /
Ià:ia'khaton

save, to

sataweiè:ton
kataweiè:tons
aiontaweiè:ton
rotaweiè:ton

say, to

tsì:ron
kì:rons
iè:rons
rá:wen'

scalp
on my scalp

onon'òn:ra'
kenon'onhrà:ke



| | |
|------------------------|--|
| scales, fish | iótstare' |
| scales, weighing | iekontsheri harákhwa' |
| scar | owì:ra' |
| scare someone, to | tashieaton' nékten
tekheiaton' nektén: nis
aontaionkiaton' nékten
tehshakoton' nektén: ni |
| scared, to get | setshà:ni'k
ketshà:nis
aietshà:ni'ke'
rotshahnì:kon |
| start, to (be started) | tasatón'nek
tkatón'neks
aontaiontón'neke'
thoton' nékon |
| scarf | teiontenia' tarakstákhwa' /
teiontenia' tarahnátha' |
| scarlet fever | iako' tonhkwahroskó:wa |
| school | ionteweienhstákhwa' |
| scissors | tewata' sharí:sas |
| Scottish | Ken' táhere' |
| scrape, to | ísket
íkkets
aié:kete'
roké:ton |
| screw, a | tekahsonwatá:se'
kanón:ware' |



| | |
|----------------------------|---|
| screw, to twist | shwatá:se'
khwatá:se's
aiehwatá:se'
rohwatá:son |
| seal, a (animal) | otsí:io |
| seal, a (gum) | kahnehtárhro |
| seal something, to | sehnehtárhro
khnehtárhros
aiehnehtárhro'
rohnehtárhron |
| seal, to close | senón:tek
kenón:teks
aienón:teke'
rononté:kon |
| secure, to to tie | shwénnerenk
khwénnerenks
aiehwénnerenke'
rohwénneren |
| see, to | satkáhtho
katkáhthos
aiontkáhtho'
rotkáhthon |
| seed, a | ká:nen |
| sell, to | satenhní:non
katenhní:nons
aiontenhní:non'
rotenhní:non |
| send something away,
to | ia'saténieht
iekateniéhtho'
iaionténiehte'
iohoteníéhton |

| | |
|---------------------|---|
| set down, to | ítsien
íkiens
aié:ien
ró:ien |
| sew, to | se'níkhon
ke'níkhons
aie'níkhon
ro'níkhon |
| shake something, to | sá:wak
ká:waks
aión:wake'
rowá:kon |
| sharp, it is | iohio'thí:ion |
| shawl | teionteweiahrahkhwa' |
| she (emphatic) | akáonha |
| sheep | teiotina'karatón:'a |
| shin | onién:ta'
kenientà:ke |
| shirt | oià:kara' |
| shiver, to | saia'tíshonhkw
wakia'tishónhkhwa'
aiakoia'tíshonhkwe'
roia'tishónhkwen |
| shoe | áhta |
| shoot, to | sarón:tat
karón:tats
aiorón:tate'
rorontáton |

| | |
|----------------------------------|---|
| shore, along | atsià:kta' |
| shoulder | ohnénhsa'
khnenhsà:ke |
| show, a (movie) | teióia'ks |
| show something to
someone, to | shena'tón:ha's
khena'tón:ha's
aiontatena'tónha'se'
shakona'tón:ni |
| shrink, to | satò:rok
katò:roks
aiontò:roke'
rotò:ron |
| shrink something, to | satò:rokst
katohróksth'
aiontò:rokste'
rotohrókston |
| shut something, to | sehn hó:ton
kehnhó:tons
aiehn hó:ton'
rohn hó:ton |
| side-by-side | tekiatera'nè:ken |
| silk | kà:nhes |
| silk ribbon | o'nhéksa' |
| silver | kahwistará:ken |
| sing, to | saterennó:ten
katerennótha'/katerennó:-
ten's
aionterennó:ten'
roterén:note'/roterennó:-
ten |

sister, my elder

aktsí'a

sit down, to

sákien
kákien
aiónkien'
rókien

skin, a

óhna'

skip, to

tesate'khahón:ti
tekate'khahónkie's
taionte'khahón:ti'
tehote'khahónkion

skirt

o'wháhsa'

skunk

anì:ta's

slacks

atháhsteren

slam a door, to

sehnhóhaienht
kehnhohaiénhtha'
aiehnhóhaienhte'
rohnhohaiénhton



sleep, to

sén:ta'w
wakí:ta's
aiakó:ta'we'
rotá:'on

slip, a

kà:khare'

slippers

ionahsi'tókstha'

smell, a bad

a'ónsera

smell something, to

satéhsaht
katehswáhtha'
aiontéhsahte'
rotehswáhton

| | |
|-----------------|---|
| smoke | satshó:ko
katshókwas
aiontshó:ko'
rotshókwen |
| snake | ò:niare' |
| snap, a | tekatsí'toks |
| snipe | tawístawis |
| snow | óniehte' |
| snowing, it's | io'kerén:'en |
| snowflake | ò:kera |
| snowshoe | ohwèn:kara' |
| snowbird | iotiwíhsto |
| Snye | Tsi Snáihne |
| soap | ononhwarè:tha' |
| sock, stocking | ká:ris |
| soft drink | wathnekatákwas/
teiohnekatsikhè:tare' |
| soldier | sotár |
| sole
my sole | ohsi'tò:kon
kahsi'tò:kon |
| sometimes | shewaké:ren |
| some other | ókia'ke |
| soon | iohsnó:re' |

| | |
|---------------------|--|
| soul | atónnhhets |
| soup | onon:tara' |
| sparrow | tsítha |
| speak, to | satá:ti
katá:tis
aiontá:ti'
rotatí'on |
| spear | áhsikwe' |
| spice | wenserákon onhshsón:'a |
| spider | takwa'áhson |
| spin around, to | satshinonhwaténia't
katshinonhwatenià:tha'
aiontshinonhwaténiahte'
rotshinonhwaténion |
| splash, to | tesatstarókwaht
tekatstarokwáhtha'
taionstarókwahte'
tehotstarokwáhton |
| splint | o'nón:na' |
| splinter | ohsáhtara' |
| split, it is | teió:ren |
| split something, to | tesó:ren
tekó:rens
taiakó:ren
tehaó:ren |
| spoon | atókwa |

| | |
|-------------------------------------|--|
| spoon for stirring | ahserawénrie' |
| spring | kakwitè:ne/kenkwitè:ne |
| sprinkle, to | tesatstarókwaht
tekatstarokwáhtha'
taiontstarókwahte'
tehotsterokwáhton |
| sprout, a | ohnióhkwa' |
| spruce | o'sò:ra' |
| squash, a | kioneri'tstakè:tote' |
| squeeze something, to | tesahtò:rarak
tekahtò:raraks
taionhtò:rarake'
tehohtohrará:kon |
| squirrel | aró:sen |
| squirrel, grey | onkwe'tá:kon |
| stand, to | tésta'n
tékta's
taié:ta'ne'
tehotá:'on |
| stand or put things
together, to | tesera'né:ken
tekera'né:kens
taiera'né:ken
tehora'né:ken |
| star | otsísto |
| start, to | tasatáhsawen
tkatahsáwha'
aontaiontáhsawen'
thotahsá:'on |



kioneritstakè:tote'

| | |
|----------------------------------|--|
| starvation | atonhkarià:ktshera |
| State Road | Sahtsherá:ti |
| stay home, to | tsi'terón:tak
ki'terón:taks/kì:terons
aie'terón:take'
ren:teron |
| steal, to | senénhsko
kenénhskwas
aienénhsko'
ronénhskwen |
| stepladder | kanekó:ta' |
| step, to take a | tesate'kháhahk
tekate'khahákhwa'
taionte'kháhahkwe'
tehote'khaháhkwen |
| stiff, to be | iota'tíhen |
| stomach (belly)
on my stomach | onekwen:ta'
kenekwen'tà:ke |
| stomach (intestine) | ohsiehoń:ta |
| stone | onén:ia' |
| story | aká:ra'/oká:ra' |
| straighten, to | stakwaríhsion
ktakwaríhsions
aietakwaríhsion
rotakwaríhsion |
| strange | thiká:te' |
| strawberry | niiohontéssha' |

| | |
|-----------------|---|
| stretch, to | tesatirón:ten
tekatirón:ten
taiontirón:ten
thotí:ronte' |
| string, to | sa'tanihá:ron
ka'taníhara's
aion'tanihá:ren'
ro'taníharon |
| stroke | kaia'takenheiónhtshera' |
| study, to learn | satóweienhst
katoweiénhstha'
aiontóweienhste'
rotoweiénhston |
| sturgeon | teiokién:tare' |
| suck, to | senon'ké:ra
kenon'ké:ras
aienon'ké:ra'
ronon'ke':ren |
| suffer, to | tsié:sa
kié:sas
aieié:sa'
roié:son |
| sugar | otsikhè:ta' |
| suit | atahkwénia |
| summer | akenhnhà:ke |
| summer resort | iontewistohtákhwa' |
| sun | karákhwa |
| Sunday | Tsiatákhaton/
Aiawentatokenhti |

| | |
|----------------|--|
| sunfish | atenà:tara |
| sunshine | ioráhkote' |
| suspenders | ionthnenhsotahrókstha' |
| swallow | ken'tarakonhá:'a |
| swear, to | saterihwakà:tenhst
katerihwakaténhstha'
aionterhwakà:tenhste'
rorihwakà:te' |
| sweet | teiotsikhè:tare' |
| sweeten, to | testsikhe'táhrho
tekatsikhe'táhrhos
taietsikhe'táhrho'
tehotsikhe'táhrho' |
| sweetflag | onennó:ron |
| sweet grass | wenserákon óhonte' |
| swim, to | satá:wen
katá:wens
aiontá:wen'
rotá:wen |
| swing, a | iontonwiharákhwa' |
| swollen | iò:to |
| swollen glands | iakotenià:ko |
| sword | a'share'kó:wa |
| syrup | óhshes |

T

table

atekhwà:ra

tail

big tail

long tail

otáhsa'

kentahsa'kó:wa

kentáhses

take, to

iahà:sha

iékhas

iaieiáhawe'

iehóha

take apart, to

serihsión:ko

kerihsiónkwas

aierihsión:ko'

rorinsiónkwen

take out, to

tsiá:kenhw

kiá:kens

aieiá:kenhwe'

roiakénhon

take an oath, to

serihwahní:rat

kerihwahní:rats

aierihwahní:rate'

rorihwahnirá:ton

talk

satá:ti

katá:tis

aiontá:ti'

rotá:ti

tamarack

kanèn:ten's

tea

loose tea

tí

teiotitsherahrí:'on

teach someone, to

sherihónnien

kherihónniens

aiontaterihónnien'

shakorihonnién:ni



kéhrhite' /karón:ta'

| | |
|------------------|---|
| teacher | iaakorihonnién:ni |
| tear, to | serátion
kerátions
aierátion
rorátion |
| tear drop, a | okáhsera |
| tears | okáhseri |
| telephone | teietharáhkhwa' |
| tell, to | sathró:ri
kathró:ris
aionthró:ri'
rothró:ri |
| tell a story, to | ská:raton
kká:ratons
aieká:raton'
roká:raton |
| tent | a'tóhsera |
| thank you | niá:wen |
| that | ne thí:ken |
| that is so | tó:ske tho ní:ioht |
| the way it is | tsi ní:ioht |
| then | eh thó ne
sók |
| there | íse' |
| right there | eh tho nón:we |
| over there | ise' nonkwá:ti |
| way over there | ha'é:ren |

| | | |
|-----------------------------------|--|--|
| therefore | ase'kén | |
| thief | ranénhskwas | |
| think, to | sanonhteníón:ko
kanonhteníónkwas
aienonhteníón:ko'
rononhteníónkwen | |
| this | kí:ken | |
| this one | né kí:ken | |
| this far | ken' niió:re' | |
| this side | ka' nekwa:ti | |
| thistle | ohníón:wara' | |
| Thomas | Atoón:wa | |
| thorn tree | ohì:kta' | |
| thread, rope, twine,
line | ahserí:ie | |
| throat (inside) | tsi iakonia'takà:ronte' | |
| throat (neck) | onià:kwa'
kenia'kwà:ke | |
| other than the one
you thought | akorén'stsi | |
| throw, to (away) | ia'sá:ti
iewakákie's
iaiakókion'
iehókion | |
| thumb | otsiweiónhkara' | |



ohníón:wara'

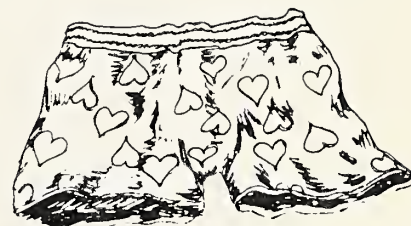
| | |
|---|---|
| Thursday | Kaieríhaton/
Okaristiiáhne |
| tie, a | iontenia'taranákstha' |
| tie, to | skwánerenk
khwánerenks
aiehwánerenke'
rohwáneren |
| tiger | tako'skó:wa |
| tighten, to | shní:rat
khní:rats
aiehní:rate'
rohnirá:ton |
| time
at that time
a long time ago | tsi nikahá:wi
shontakahá:wi
wahón:nise |
| tip something, to | skarèn:rat
kkarèn:rats
aiekarèn:rate'
rokarenhrá:ton |
| tired, to be | tewakhwisenhé:ion
tesahwisenhé:ion
teiakohwisenhé:ion
tehohwisenhé:ion |
| tobacco | oien:kwa' |
| today | wenhniserá:te/ón:wa |
| toe | ohiakwí:ra'
kahiakwirà:ke |
| toenail
on my toenail | otsi'é:ra
ktsi'era:ke |

| | |
|---------------------|--|
| tomato | taméto |
| tomorrow | enióhřen'ne' |
| tongue | awen'náhsa' |
| on my tongue | ken'nahsà:ke |
| too | ó:ni |
| tooth | onawí:ra |
| on my tooth | kenawirà:ke |
| top | è:neken |
| top (toy) | katsiskaiennì:ta' |
| torso | oià:ta' |
| on my torso | kia'tà:ke |
| tortoise | a'nón:wara |
| torture someone, to | sheié:saht
kheiesáhtha'
aiontakié:sahte'
shakoiesáhton |
| touch, to | ai'tsié:na
iekié:nas
aieié:na'
roié:nen |
| towel | iontkonhsekowáhtha' |
| train | otiio'kéha' |
| travel, to | tesatstikáhwha
tekatstikáhwhas
taiontstikáhwha'
tehotstikáhwhon |
| tree | kéhrhite'/karón:ta' |

| | |
|-------------------|---|
| tripe | onekerè:ta |
| trouble, to cause | tese'nikonhrhá:ren
teke'nikónhrhare'
taie'nikonhrhá:ren
teho'nikonhrhá:ren |
| trout | tsiokià:kton |
| true, it is | tó:ske' |
| try, to | sate'nién:ten
kate'nién:tens
aionte'nién:ten'
rote'nién:ten |
| try harder, to | sakhwíson
kakhwísons
aionkhwíson'
rokhwíson |
| tuberculosis | kahnhrakaiónhtshera |
| Tuesday | Tekeníhaton/Ratironhia'-
kehronón:ke |
| Tupper Lake | Tsiskaniatare'skó:wa |
| turkey | skawiró:wane' |
| turn, to | skahrátho
kkahráthos
aiekahrátho'
rokahráthon |
| turnip | otsihkwa'kó:wa |
| turtle | a'nó:wara |
| type, to | teserihstò:rarak
tekerihstò:raraks
taierihstò:rarake'
tehorihstohrará:kon |

U

| | |
|---------------------|--|
| ugly | kahétken |
| unable, | iah teiotón:'on |
| unadvised | iah tekahtará:ni |
| unbuckle, to | teshniáhskarík
tekhniáhskaríks
taiehniáhskaríke'
tehohiahskarí:kon |
| unbutton, to | stsihkotá:ko
ktsihkotákwas
aietsihkotá:ko'
rotsihkotákwen |
| uncommunicative, be | iah teiontá:ti |
| uncooked | iah tekarihton/
iokáhte' |
| underground, be | ohontsiokónhson |
| underneath | nà:kon |
| undernourished, be | kiakotekhwakoktá:ni |
| understand, to | sa'nikonhraieñ:ta'n
wake'nikonhraieñ:ta's
aiako'nikonhraieñ:ta'ne'
ro'nikonhraientá:'on |
| underwear | nà:kon kiontsha'/
nà:kon kié:iens |
| undo, to | taseríhsi
tkeríhsions
aieríhsion'
thoríhsion |



nà:kon kiontsha' /
nà:kon kié:iens

| | |
|-------------------|---|
| unfortunate, be | karihwanó:ron |
| unharness, to | sahkweniahra':ko
kahkweniahra'kwas
aionhkweniahra':ko'
rohkweniahra'kwen |
| unlock, to | seniethara':ko
keniethara'kwas
aienithara':ko'
roniethara'kwen |
| untangle, to | tesani'tonnia'hsi
tekani'tonnia'hsions
taion'tonnia'hsion'
tehoni'tonnia'hsion |
| up | è:neken |
| upside down | kakahra'thon |
| upstairs | kanonhsohara':ke |
| urine | ohnen'ha/ohnen'hohsa |
| use something, to | í:sats
ka'tstha'
á:iontste'
ro'tston |
| uterus, womb | atewirara':tha' |

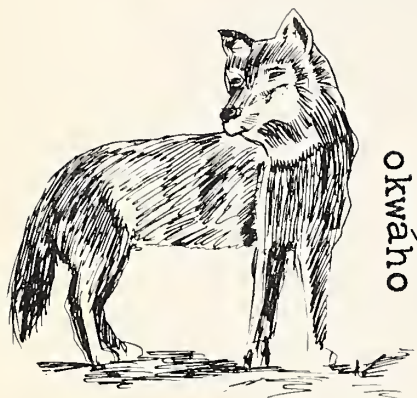
V

| | |
|------------------|---|
| vagabond | tehatonhwentsiatá:se's |
| vase | ietsi'tsiarákhwa' |
| vegetables | ase'shoń:'a |
| vehicle | kà:sere |
| veil | ionta'arohróktha' |
| vein | otsinonhiáhton |
| venereal disease | kahnhráksen |
| vinegar | teiohnekahiò:tsis |
| visit, to | senatà:ra
kenatà:re's
aienatà:ra'
ronatà:ron |
| voice | owén:na' |

kà:sere



W



okwáho

waist
on my waist ohsia:kara'
khsia'karà:ke

wait, to satehrá:rat
katehrá:rats
aiontehrá:rate'
rotehrará:ton

wake up, to satkétsko
katkétskwas
aiontkétskon
rotkétskon

walk, to tesatekháhahkw
tekatekhahákhwa'
taiontekháhahkwe'
tehotekhaháhkwen

wall
on the wall ahsónhten
ahsonhta:ke

want, to í:kehre'
íhsehre'
á:iehre'
à:renhre'

warm, be io'taríhen

warrior raterí:ios

wart ohnè:ta'

wash, to senóhare
kenóhares
aienóhare'
ronóhare'

wasp ratenawatstanentáktha'

| | |
|---------------------|---|
| waste, to | sakié:saht
kakiesáhtha'
aionkié:sahte'
rokiesáhton |
| watch | karáhkwa kaion:tha' |
| watch, to (look at) | saterò:rok
katerò:roks
aionterò:roke'
roterò:ron |
| water | ohné:kanos |
| hard water | iohnekahní:ron |
| rainwater | ohsterákeri |
| salt water | kiohio'tsistákeri |
| watermelon | onon'onserakáhte' |
| wave, to | tesanentsshateníhon
tekanentsshateníhons
taionentsshateníhon
tehonentsshateníhon |
| waves | taietierónhsere' |
| weasel | onón:kwet |
| Wednesday | Ahsénhaton/Soséhne |
| week, one | tsiahià:kshera |
| weight | okónhtshera |
| wet, be | ionà:nawen |
| whale | tsionhnó:wane' |
| what? | oh nahò:ten |

| | |
|----------------------------------|---|
| wheat | onátsia' |
| when? | kátke |
| where? | ka' nón:we |
| which | ka' níká:ien |
| while | tsi nikarì:wes |
| whip | ó:kwire' |
| white | kará:ken |
| white ash | kanéhron/o'nòn:na |
| White people
English speaking | Ratinenrá:ken
Kiohrensha:ka |
| who? | ónhka' |
| wolf | okwáho |
| word | owén:na |
| work (noun) | kaio'ténhtshera |
| work, to | saió'te'
wakió'te'
aiiakoió'ten'
roió'ten' |
| write, to | shia':ton
khiá:tons
aiehiá:ton'
rohiá:ton |

Y

| | |
|----------------|--|
| yams | teiohnenna'tatsikhè:tare' |
| yank, to | senèn:renht
kenenhrénhtha'
aienèn:renhte'
ronenhrénhton |
| yard | kahentà:ke |
| yardstick | sewatáhtshera |
| yarn | ieriserenionià:tha' |
| year, one | tsiòhsera |
| yeast | ieshe'rhenhtákhwa' |
| yell, to | tesahén:reht
tewakhenréhtha'
taiakohén:rehte'
tehohenréhton |
| yellow | otsì:nekwar |
| Yellow Lake | Katsèn:nekwar |
| yes | hén |
| yesterday | thetén:re' |
| yogurt | okaiéhta' |
| you (emphatic) | í:se' |
| yourself | sonhá:'ak |



teiohnenna'tatsikhè:tare'



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